THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[Registered as a Newspaper.]

Vol. XXXII. No. 812.] LONDON, DECEMBER 3, 1878. [30th Year.] Price 6d.

COOKE BROS.

See Page 829.

26, 27, & 28, FENCHURCH ST.,

LONDON, E.C.

GENUINE TORBAY PAINT
And SPECIAL GASOMETER PAINT.
Several Prize Medals. Established over 20 Years.
These Paints are now used in over 200 Country Gas-Works, and by all the London Gas Companies, on Gas-holders, Scrubbers, Purifiers, &c. Also used by the Admiralty, War Office, Railway Companies, Founders, &c. They prevent and arrest rust, and protect iron from the action of water, sulphurous and gaseous exhalations; do not crack, blister, or flake off; will cover tar effectually.
The covering powers are considerably greater than those of any other Paint.—*See "Engineer," Nov. 2, 1866.*
Supplied, mixed ready for use, or in paste, as desired.
TORBAY PAINT COMPANY.
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Works: BRIXHAM, TORBAY.

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BROOKFIELD GAS APPARATUS WORKS,
103, ICKNIELD STREET EAST, BIRMINGHAM.
CONTRACTOR FOR
LAYING MAINS
FOR
Gas, Water, & Sanitary Purposes,
AND MANUFACTURER OF
WOOD GRIDS
FOR
SCRUBBERS AND PURIFIERS.

COWEN'S PATENT FIRE-CLAY RETORTS.
JOSEPH COWEN and CO.,
BLAYDON BURN, BLAYDON-ON-TYNE,
Were the only parties to whom a Prize Medal was awarded at the Great Exhibition of 1851, for "Gas-Retorts and other Objects in Fire-Clay," and they were also awarded at the International Exhibition of 1862, the Prize Medal for "Gas-Retorts, Fire-Bricks, &c., for Excellence of Quality."
J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts and Fire-Bricks in the Kingdom. Orders for Fire-Clay Retorts of all shapes and dimensions, and to fit any shaped Mouthpiece, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.
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Jos. Cowen & Co. are the only Manufacturers of Fire-Bricks and Clay Retorts at Blaydon Burn.

JOHN RUSSELL & CO.,
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Established at the commencement of Gas Lighting,
Manufacturers of
TUBES AND FITTINGS.
THREE PRIZE MEDALS,
Paris, 1878.
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OLD PATENT TUBE-WORKS, WEDNESBURY.

JOHN BENT & SON,
BELL BARN ROAD, BIRMINGHAM,
Manufacturers of
WET AND DRY GAS-METERS,
Licensees and Manufacturers of
HUNT'S
PATENT COMPENSATING METERS,
STREET-LAMPS, &c., &c.
Established 1830.

THOMAS PIGGOTT & CO.,
SPRING HILL, BIRMINGHAM,
Manufacturers of
TELESCOPIC & SINGLE GASHOLDERS,
CAST & WROUGHT IRON TANKS FOR DITTO,
And Gas Apparatus of every Description.
Marine, Tubular, Cornish, Plain, Furnace, Saddle, and Range Boilers.
Sugar, Saltpetre, and all kinds of Pans.
Roofs, Girders, and Bridges, and General Smith's Work.

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BUILDERS AND CONTRACTORS
FOR THE
ERECTION AND REBUILDING OF GAS AND WATER WORKS.
ESTIMATES FREE
FOR MAIN-LAYING AND GENERAL REPAIRS
RETORT-SETTING A SPÉCIALITÉ.
ROBUS'S IMPROVED RETORT-SETTINGS guaranteed to carbonize a large amount of coal with a small per cent. of fuel.
N.B.—All kinds of Fire Goods, &c., kept in stock for immediate delivery. Orders promptly attended to.
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NITSHILL COMPANY'S
DUKE OF HAMILTON'S
LESMAHAGOW
CANNEL COAL.
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JAMES M'KELVIE,
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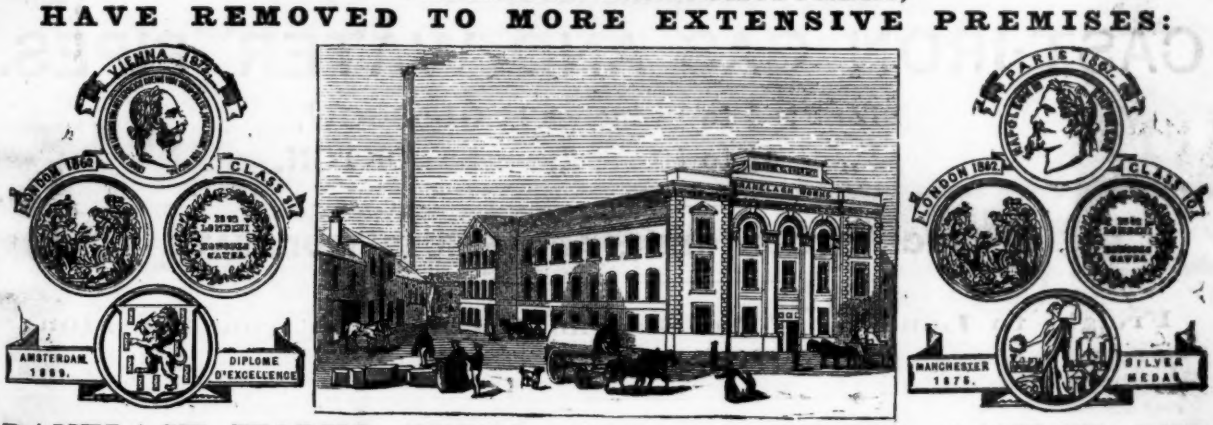
EDINBURGH.

CHANGE OF ADDRESS.
GEORGE GLOVER AND CO.,
DRY GAS-METER MANUFACTURERS,
HAVE REMOVED TO MORE EXTENSIVE PREMISES:



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Manufacturers of **W. J. WARNER'S PATENT MARKET GAS STAND-PIPE.**

Now ready, GAS CHANDELIER BOOK (Reduced Prices), 7s. 6d.

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IMPROVED CONSUMERS WET GAS-METERS

IN CAST-IRON CASES,

THE UNVARYING WATER-LINE GAS-METER,

AND

IMPROVED DRY GAS-METERS;

STATION-METERS OF ALL SIZES, with PLANED JOINTS;

GOVERNORS, PRESSURE AND EXHAUST REGISTERS, TEST HOLDERS.

And all kinds of Experimental Gas Apparatus.

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GLASGOW;

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Manufacturers of

CAST-IRON GAS AND WATER PIPES.

SIZES: ¾ to 12 inches at GLASGOW.
„ 1½ to 10 „ STOCKTON.

A LARGE STOCK KEPT, AND PRICES MODERATE.

Freight to London, in the Stream, 10s. per ton from Stockton; 15s. from Glasgow.

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WELLS, BIRCH, RYDE, and CO., Limited,

HOYLAND SILKSTONE COLLIERIES,

Near BARNSLEY.

This Company is now in a position to raise **2000 tons per day of REAL OLD SILKSTONE GAS COAL.**

"The quality of this Coal for Gas purposes, if equalled, is not excelled by any on record, and the Coke competes successfully with best Durham."—See *Mining Journal*, Aug. 11, 1877.

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Full particulars will be sent on application to above address.

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Effecting a great saving in the cost of discharging Coals from Vessels, Barges, &c. Several of these Cranes, with the necessary power, are now being erected at the Beckton Gas-Works.

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HYDRAULIC APPARATUS for Lifting and Lowering Purifier-Covers.

Sixteen recently erected at Beckton, applied to Covers 30 feet square.

GAS AND WATER PIPES, ROOFING, BOILERS, &c.

SULPHATE OF AMMONIA APPARATUS,

IN SUCCESSFUL OPERATION AT THE NEW WORKS OF THE NEWCASTLE AND GATESHEAD GAS COMPANY.

For particulars, apply to

JOHN ABBOT & CO., LIMITED,

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WEST'S GAS IMPROVEMENT COMPANY,

LIMITED,

ARE NOW PREPARED TO SUPPLY AND ERECT THEIR PATENTED MACHINERY FOR

CHARGING AND DRAWING GAS-RETORTS,

And to enter into arrangements with GAS COMPANIES for its use upon moderate terms of Royalty.

The Patented Machinery has secured the approbation of all Engineers who have visited the MAIDSTONE GAS-WORKS, *where it is in full operation, and may be inspected at any time on application to the Manager.*

The advantages attending its use are—

INCREASED VOLUME OF GAS PER TON.—INCREASED YIELD PER RETORT.—INCREASED BULK OF COKE FOR SALE.—REDUCTION IN LABOUR AND LESS DEPENDENCE ON SKILLED STOKERS.

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WILLEY & COMPANY,

GAS ENGINEERS,

WORKS: COMMERCIAL ROAD, EXETER,

INVITE THE ATTENTION OF GAS COMPANIES AND OTHERS FOR THE SUPPLY OF

EVERY DESCRIPTION OF GAS APPARATUS.

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NEW GAS-WORKS erected complete. Plans and Estimates furnished. MAINS, METERS, SERVICES, LAMPS, &c., adapted for Towns of any size. Gas Companies advised on Improvements, Extensions, and Alterations of Works.

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RETORTS and RETORT-HOUSE FITTINGS, CONDENSERS, SCRUBBERS, ENGINES and EXHAUSTERS, PURIFIERS, STATION-METERS, GOVERNORS, VALVES, &c.

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They beg special attention to the excellence and superiority of their WET and DRY METERS, several thousand being now in use by many of the largest Gas Companies in the West of England and South Wales. Warranted to measure correctly, and not to vary. Their acknowledged superiority has brought them into general use more rapidly than any Meters hitherto manufactured. A guarantee of Five years tendered with each Meter.

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An extensive variety of Choice Designs in CHANDELIERS, PENDANTS, BRACKETS, STAR and SUN LIGHTS, MEDIÆVAL FITTINGS for CHURCHES, &c.

PATTERN-BOOKS and PRICE LISTS furnished.

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OXIDE OF IRON.
GAS PURIFICATION & CHEMICAL Co., LIMITED,
PALMERSTON BUILDINGS, OLD BROAD STREET, LONDON, E.C.

JOHN WM. O'NEILL, Managing Director.

THE
STANDARD WASHER AND SCRUBBER.
[KIRKHAM, HULETT, AND CHANDLER'S PATENT.]

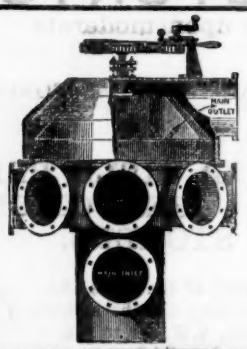
Some of the advantages claimed for this Apparatus are as follow:—

The Exposing of a large Amount of Effectually-wetted Surface (which is continually reproduced) to act upon the Gas.
Unerring Regularity in the Distribution of the Liquor.
Saving of Expense in Providing and Exchanging Scrubbing Material—none being required.
Economy of Space, thus enabling the Apparatus to be protected from the Weather.
Economy of First Cost and of Maintenance.
It works without Pressure.
It is particularly adapted for Gas-Works where Sulphate of Ammonia is manufactured.

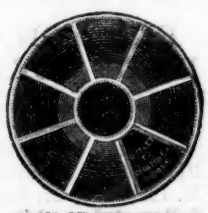
Applications for Prices, &c., to be made to

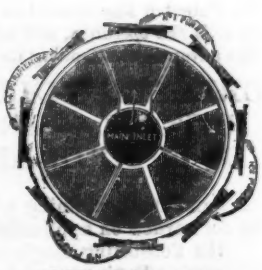
Messrs. KIRKHAM & HERSEY, GAS ENGINEERS, 21, ABINGDON STREET, WESTMINSTER.

C. & W. WALKERS'
PATENT CENTRE-VALVES.



ELEVATION OF THE CENTRE-VALVE.


PLAN OF THE VALVE.



PLAN OF THE BODY.

These PATENT CENTRE-VALVES are the most perfect and certain means for working Purifiers on the system of three in action, and one out of action. The Valve itself is protected from all injury inside the safety cover. The working of the Valve is so easy, and so governed by the stop-catch movement, that the Purifiers can be instantaneously changed in the dark as well as in daylight. They are scraped perfectly true, metal to metal, the facings heretofore exposed are always covered, and there is nothing more reliable, certain, and durable in a gas-works. By their use the floor of the Purifying-house is clear and level; the Valve and all connexions being beneath the floor, out of the way of working. A considerable improvement and saving is effected in the cost of the connecting-pipes.

MIDLAND IRON-WORKS. DONNINGTON, near NEWPORT, SHROPSHIRE; 8, FINSBURY CIRCUS, LONDON.

EDWARD COCKEY & SONS,
GAS ENGINEERS, FROME SELWOOD,
MANUFACTURERS OF ALL DESCRIPTIONS OF
APPARATUS CONNECTED WITH GAS-WORKS.
THE ORIGINAL PATENTEES AND MANUFACTURERS OF THE
DRY-FACED VALVES
FOR PURIFIERS, GASHOLDERS, BYE-PASS, AND OTHER ARRANGEMENTS REQUIRING VALVES IN GAS-WORKS.

The Faced Valves, as made by the Patentees, continue to give great satisfaction, and they are being used extensively by many of the best gas engineers of the day.

They are more easily repaired than any other kind of Valve in use, and can be re-ground in a few hours without removal, and made perfectly gas-tight.

References can be given to many Engineers of high standing, who will testify as to the favour in which they are held.

MANUFACTURERS ALSO OF SUPERIOR WOOD GRIDS FOR PURIFIERS, SCRUBBERS, &c.

GEORGE ORME & CO.,

ATLAS METER-WORKS, OLDHAM,

MANUFACTURERS OF

WET AND DRY GAS-METERS,

STATION-METERS, GOVERNORS,

PRESSURE AND EXHAUST REGISTERS,

LAMP-METERS IN CAST-IRON BOXES,

And every Description of Gas Apparatus.

J. T. B. PORTER & CO.,

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ESTIMATES FOR GAS-WORKS OF ANY SIZE.

REFERENCES TO 500 WORKS ALREADY ERECTED.

N.B.—All Communications to be addressed to the FIRM ONLY.

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MANUFACTURERS OF

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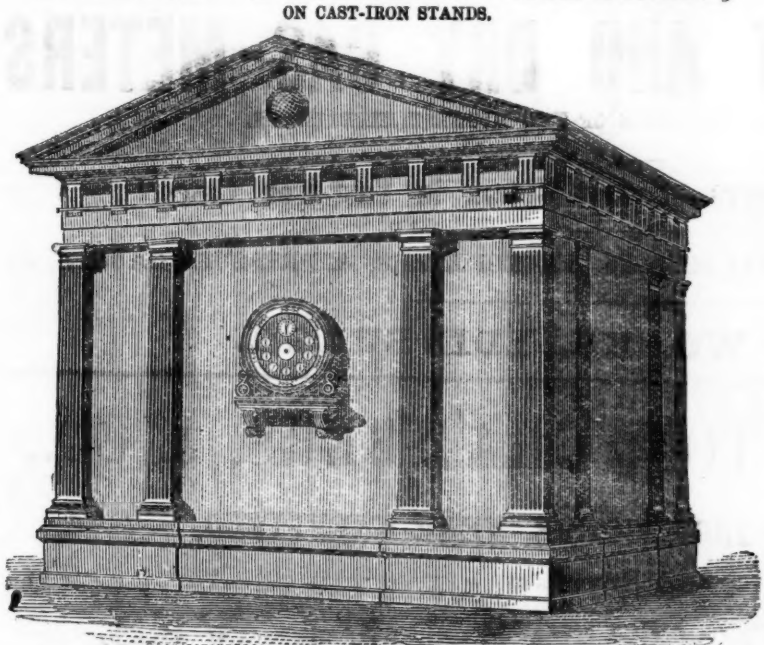
OF THE HIGHEST EXCELLENCE ONLY;

ALSO LICENSEES AND MANUFACTURERS OF

WARNER & COWAN'S PATENT SELF-REGULATING GAS-METERS;

ROUND STATION-METERS,

ON CAST-IRON STANDS.



SQUARE STATION-METERS,

WITH PLANED JOINTS.

GOVERNORS, GAUGES, INDICATORS, MAIN COCKS, &c.

GAS COOKING APPARATUS.

Home and Foreign Orders promptly attended to.

All Sizes of CONSUMERS METERS, STATION-METERS, and GOVERNORS generally in Stock.

Orders almost invariably despatched on the day of receipt.

TERMS, &c. ON APPLICATION.

C. & W. WALKER'S

WOOD PURIFIER SIEVES,

Which have now been used for fifteen years, and their advantages and durability fully established. They are made entirely by steam machinery in very large quantities at the most moderate cost.

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FINSBURY CIRCUS, LONDON.

ESTABLISHED IN 1860.

BENJAMIN CARPENTER,

THE ORIGINAL MANUFACTURER OF THE IMPROVED

WOOD SIEVES

FOR

GAS PURIFIERS & SCRUBBERS.

PROVIDENCE WORKS,

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DEMPSTER & SONS'

RENOWNED

WOOD SIEVES,

WITH TAPER BARS,

MADE BY MACHINERY

CAPABLE OF MAKING 10,000 FEET WEEKLY.

References to Hundreds of First-Class Engineers.

ROSE MOUNT IRON-WORKS,

ELLAND, NEAR HALIFAX.

JOHN ROMANS, C.E., F.G.S.E.,

CONSULTING GAS ENGINEER

AND

CANNEL COAL FACTOR,

30, St. Andrew Square, EDINBURGH.

Plans and Estimates furnished; Gas-Works, Apparatus, Pipes, Machinery, Fire Goods, &c., supplied, or Attested and Shipped for Exportation.

GAS-WORKS TAKEN ON LEASE.

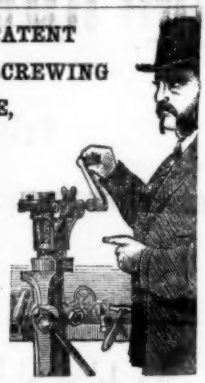
Mr. ROMANS has for upwards of 30 years been practically engaged in the Manufacture of Gas, and has, by extensive experiments, ascertained that by JUDICIOUS INTERMIXTURE of the lighter with the heavier gases, much of the rich Hydrocarbons CAN BE SAVED, which otherwise ARE LOST, during the process of manufacture. He is therefore enabled to give advice to those who favour him with their orders for Cannel, as to the class which will secure for their standard of illuminating power the HIGHEST ADVANTAGEOUS RESULTS.

ANALYSIS AND PRICES FORWARDED ON APPLICATION.

GRIRDROD'S PATENT

PORTABLE PIPE SCREWING

MACHINE,



For 1 in., 1¼ in., 1½ in., and 2 in. Gas Threads, complete £7 10s.

In use at the chief gas-works, and giving great satisfaction.

For other useful goods, see Bailey's "Illustrated Inventions," post free 3s. 6d.; gratis to ledger customers.

W. H. BAILEY & CO.,

Brassfounders, Gauge Injector and Tool Makers,

ALBION WORKS, SALFORD,

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THOMAS TURTON AND SONS,

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MANUFACTURERS OF

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FOR ENGINEERS,

STEEL OF ALL DESCRIPTIONS,

SCREW STOCKS, TAPS, AND DIES, SPANNERS

RATCHET BRACES, LIFTING-JACKS,

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The following Medals have been awarded:—

GRAND COUNCIL MEDAL, LONDON, 1851. MEDAL, LONDON, 1862. GOLD MEDAL, PARIS, 1867,

The only Gold Medal awarded for "Apparatus and Processes for Heating and Lighting" by the Imperial Commissioners

MEDAL FOR PROGRESS, VIENNA, 1873.

The following Medals were also awarded at Paris, 1878:—

GOLD MEDAL for Chandeliers and Gas-Fittings.

GOLD MEDAL (Rappel) for Metallic Bedsteads and Furniture.

GOLD MEDAL (Rappel) for Art Metal Work. BRONZE MEDAL for Tube Metal and Wire.

MANUFACTURERS OF BRASS AND COPPER SHEETS,

TUBE AND WIRE,

ROLLED METALS, LOCOMOTIVE AND CONDENSER TUBES, CYLINDERS;

Ornamental, Taper, and Cased Tubes; Tin Tubes;

GAS-FITTINGS, CHANDELIERS,

BRACKETS FOR HEATING AND LIGHTING;

METALLIC BEDSTEADS.

Ecclesiastical and Mediæval Metal Workers.

GENERAL BRASSFOUNDERS.

REGISTERED TRADE MARK:

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ALDER AND MACKAY,

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IMPROVED WET AND DRY GAS-METERS

IN CAST-IRON AND TIN CASES OF THE HIGHEST EXCELLENCE.

Original Manufacturers of Dry Meters in Cast-Iron Cases.

STATION-METERS, EXPERIMENTAL-METERS, PHOTOMETERS, & PRESSURE-GAUGES, &c.

GRANGE WORKS, EDINBURGH.

MESSRS. NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS, NEAR SHEFFIELD,

MANUFACTURERS OF

IMPROVED CENTRE-VALVES,

PURIFIERS, CONDENSERS, SCRUBBERS, GASHOLDERS, ROOFS,

And every description of Gas Machinery.

TENDERS GIVEN FOR WORK FIXED COMPLETE IN ANY PART OF THE KINGDOM.

TANGYE BROTHERS AND HOLMAN,

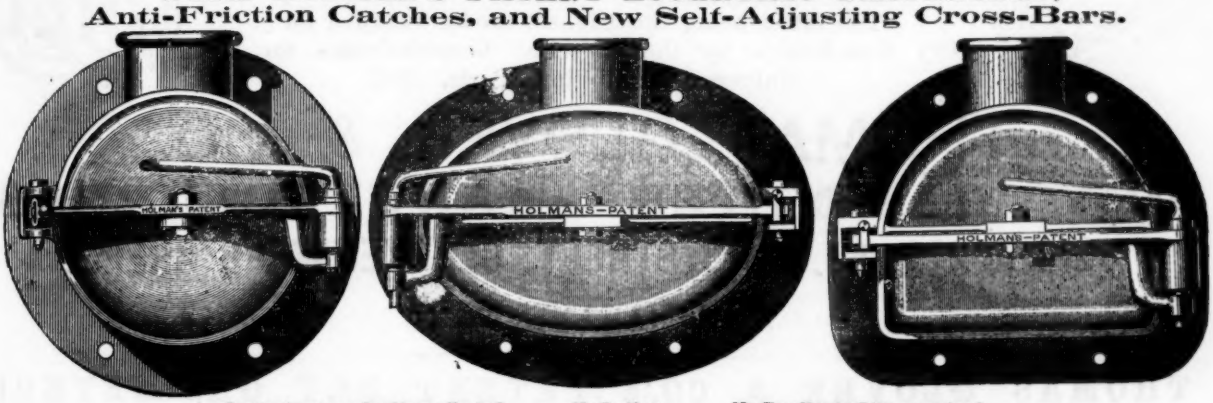
CORNWALL HOUSE, 35, VICTORIA ST., LONDON, E.C.

(LATE OF 10, LAURENCE POUNTNEY LANE.)

SOLE MAKERS OF MORTON'S PATENT SELF-SEALING RETORT-LIDS,

WITH HOLMAN'S PATENT ECCENTRIC FASTENINGS,

Anti-Friction Catches, and New Self-Adjusting Cross-Bars.



Instantaneous Sealing effected. No Luting. No Duplicate Lids required.

Holman's New Self-Sustaining Cross-Bar ensures freedom of Joint, and maintains parallel position of the Lids.

Since their introduction in 1869, these Patent Retort-Lids have been thoroughly tested, being now in use in nearly all the principal Gas-Works in London and the Provinces.

T. B. and H. are now making the "Morton's Self-Sealing Lid" of the SAME FORM OR SECTION AS THE RETORT (see Illustrations above), as well as bringing the Mouthpiece from the D or Oval at back to Circular in front, as heretofore.

D and Oval Morton's Lids are working satisfactorily both in this country, on the Continent, and in the United States of America. Among others they have been adopted by the following Gas-Works:—

The Gaslight Company's Works, Fulham; Ditto, Bromley-by-Bow; Ditto, King's Cross; Ditto, Shoreditch.
And also in the Gas-Works at Richmond, Maidstone, Gloucester, Glasgow, Portsea, Roubaix (France), The Hague (Holland

HUNT'S PATENT EQUILIBRIUM GAS-GOVERNOR.

In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communications being avoided by placing the Lever or Radius Arm (shown in the drawing) inside the Valve-Chamber upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.

The principal advantages of this arrangement over the ordinary form of Governor are as follows:—

Its sensitive action prevents oscillation.

It is self-adjusting—*i.e.*, it maintains a steady pressure under variations of inlet pressure or a fluctuating consumption.

The inlet to Gasholder being contracted to the smallest possible dimensions, all danger from leakage through insufficiency of seal, tilting, &c., is entirely avoided.

The valve portion being separate from the holder, it can be handled and fixed like an ordinary Slide-Valve direct in the main; and the holder can be placed at an convenient distance immediately above it. The cost is thus materially reduced, and the inconvenience of heavy lifts done away with.

There are no working parts likely to get out of order.

These Governors have been adopted by many leading Gas Companies, among whom are the following:—

The Gaslight and Coke Co. (9), The London Gas Co. (3), and at Abergavenny, Arundel, Birmingham, Cannes (France), Devonport, Dursley, Exeter, Guernsey, Halesowen, Mentone (France), Monmouth, Newcastle-on-Tyne, Oxford, Plymouth, Rochdale, Windsor, &c.

TESTIMONIAL.

The Gaslight and Coke Company,
9, Water Street, New Bridge Street,
Blackfriars, E.C., Feb. 27, 1875.

MESSRS. TANGYE BROTHERS AND HOLMAN.

Gentlemen,—The two 24-inch and three 36-inch Hunt's Equilibrium Governors supplied by you, and fixed in the valve-rooms at Whitechapel, Goswell Road, and Blackfriars, are working very satisfactorily.

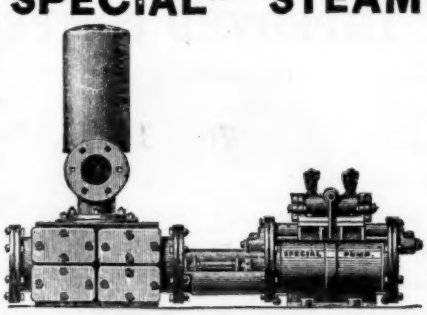
Yours truly,

(Signed) JOHN JOHNSON.

PRICES AND FULL PARTICULARS ON APPLICATION.

THE "SPECIAL" STEAM-PUMP.

Diameter of Steam Cylinder.	Diameter of Water Cylinder.	Length of Stroke.	Gallons of Water per Hour, Approximate.	Reduced Prices.
3	1½	9	450	£16
4	2	9	815	18
5*	2½	12	1,250*	20
5*	3	12	1,830*	22 10
4	4	12	3,250	25
6*	4	12	3,250*	30
5	5	12	5,070	32 10
7*	5	12	5,070*	40
6	6	12	7,330	40
8*	6	12	7,330*	50
7	7	12	9,750	50
10*	7	12	9,750*	65



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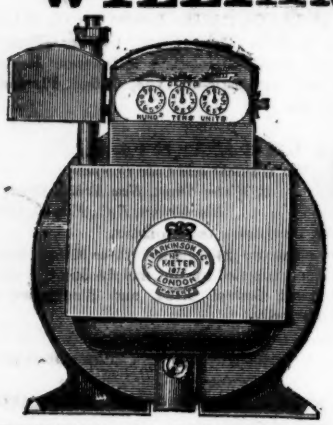

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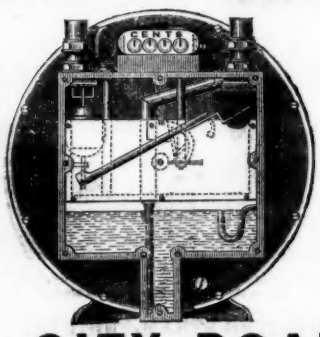

The Meter has been critically tested, and most favourably reported upon by official Meter Inspectors in London and Birmingham.

W. PARKINSON and CO. have made arrangements for the manufacture of these Meters, both in tin and cast-iron cases, and for the alteration of old ones to this principle, which is confidently recommended as possessing every quality that can be desired by Gas Companies, Corporations, or Private Consumers.

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TO CORRESPONDENTS.

Anxious to Know.—*If by a large boiler you mean a 200-horse power engine, we say "No." In small engines of 3 or 4 horse power, it is in constant use at the present day.*

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, DECEMBER 3, 1878.

Circular to Gas Companies.

The trial of the electric light made at Billingsgate Market yesterday week was admitted by all to be a failure. The reason for this may be said to be twofold. In the first place, the number of the Jablochkoff lamps in use was insufficient to illuminate the area of the market to the necessary intensity. In the second place, it seemed to us, and to all the salesmen and dealers with whom we conversed, that the light emanating from the large opalescent shades was not of a character calculated to make the judging of fish easy. The response from all the salesmen and dealers to whom we addressed our inquiries as to the value of the light was generally expressed in a few words: "It won't do." A basket of fish, containing a mixture of mackerel and whiting, being placed upon the floor almost immediately under an electric lamp, it was found practically impossible to distinguish the former from the latter.

It seems to us that the light from these opalescent globes, being so extremely white, is not of a character to enable people to distinguish between objects naturally white or light grey in colour. To arrive at any judgment as to the quality of the fish would be out of the question when the light was in operation, except for the marvellous use fish dealers make of their second fingers.

It must be well understood that we are not quarrelling with the exhibition of the light, which, so far as it went, deserved all praise. The lamps were remarkably steady, and the carbons burnt with extreme evenness. The principal fault was that there were not a sufficient number of lamps—perhaps half as many again would light the area of the market to a degree of intensity which would satisfy all beholders; but how the difficulty respecting the colour of the light is to be overcome, except by removing the opalescent shades, and working with the naked points, we do not at this moment see. Our impression is that the Jablochkoff light will not do for Billingsgate.

The area of the market on Monday evening was lighted by nine lamps, the aggregate illuminating power of which we could not ascertain. Ordinarily—it must be understood that we borrow from a contemporary—the market is lighted by 700 gas-jets, the larger number of which are, of course, in the area we refer to. A fair trial was made on Monday evening. When the gas-jets were lighted, and the Jablochkoff lamps were extinguished, nobody missed the latter, and it was generally admitted that the illumination of the market was satisfactory.

As to the relative cost of the two processes, we at present know nothing. Gas for lighting up the market—and here again we borrow—is said to cost the Corporation £794 a year. What a Robey engine of twenty-four horse-power, driving a Gramme machine with exciters, together with the cost of carbons and globes for twenty-four electric lamps, will come to, the returns of Lieut.-Col. Haywood will eventually tell us. At the present moment we can only express an unqualified opinion that the illumination of Billingsgate Market by means of the Jablochkoff lamps has proved a conspicuous failure. Turning to what is likely to be done in the future—that is, as regards the lighting of the Holborn Viaduct and the Thames Embankment—we feel confident in expressing an opinion that quite as many Jablochkoff lamps will be required as the gas-jets at present in use, and that even then the illumination will not be so good as it now is. This, however, is mere opinion, and we must leave future experiment to determine its accuracy.

We have here spoken only of the Jablochkoff system now under trial; but we understand that the experiments in front of the Mansion House will be made by means of Mr. Werdermann's invention. His strong naked lights will probably shed a blaze of luminosity over the "refuges" on which they will be placed; but, so far as we have seen, the illumination will extend but a short distance further. The row of divided lights which it seems to be suggested should be placed over the *façade* of the Mansion House, promises to have a better effect; but, as regards this, we cannot express any confident opinion until we have witnessed outdoor experiments with the Werdermann system.

It is extremely difficult to ascertain with truth what is being done, so far as relates to the perfection of electric illumination. We see what is being exhibited here in the Metropolis, and until now it has been, to use the French expression, *très peu de chose*. In America all eyes are turned to Mr. Edison, who appears to be variously described as a profound genius and an utter charlatan. We are now promised that his finished work will be complete in about six weeks time, when Gas Companies will learn what they are to be, to do, or to suffer. Pending the publication of Mr. Edison's wonderful discoveries, we may once again recommend Gas Companies to endeavour to secure the power to supply the electric light whenever and wherever such a course may be deemed desirable. The experiments which have been made in Paris go for nothing in our minds; but no one can tell what will arise out of the experiments which are now in progress in London. We do not believe, and we are satisfied that no one concerned with the conduct of these experiments considers, that they will tend to make the electric light a popular one. Still, it is well to take Time by the forelock; so we recommend Gas Companies without hesitation to put themselves in a position to supply electric illumination.

As we mentioned before, it is extremely doubtful whether or not the Municipality of Paris will continue to experiment with the new light. It seems to be generally recognized that, brilliant as the results in some respects have been, they have proved practical failures. It appears now to be admitted that the cost of the electric light in Paris has been, light for light, from six to seven times greater than that of gas. It is probable that all the exhibitions of the light with which the Municipality have been concerned were extinguished on the 30th ult.; but of this we cannot speak with certainty, and must await further advice. It is amusing to see our Local Authorities taking up the matter just as it is being dropped by the Parisian Authority. We look to the Engineers of the Corporation of the City of London and the Metropolitan Board of Works for a much more exact account of the cost of the light than has been rendered to the Municipality of Paris.

When we read the article published in another column respecting the electric light in Paris, we are struck by a consideration which we are bound to admit escaped our notice. Supposing the electric light to generally obtain in the Metropolis, there must necessarily be a great falling off in the coal duties, and this might be a source of embarrassment. Such an occurrence, however, could not militate against the general adoption of the light, if it were proved to be of utility. Some other duty could easily be found to replace the loss which would result from a restricted consumption of coal.

It is of no use attempting to disguise the fact that the electric light is attracting a good deal of attention all over the country, and the newspapers show that preparations are being made for displays in various localities. We might be surprised how the rapid production of the necessary Gramme and other dynamo-electric machines was being effected, if we did not know that a large number of the experiments are being made by the aid of

Bunsen's batteries. This is, of course, very well. It serves to display a fairly good light, but does not give us any idea as to what the future cost of it may be. Mr. Edison, according to Professor Barrett, of Dublin, is making rapid progress with his invention for raising a coil of platinum to incandescence. It does not appear, however, that he claims to obtain a high degree of luminosity by this means. Thirty or forty lights of about as many candle power, it is said, can be supplied from one Gramme machine. This is not much; but, so far as we can learn, it is all that Mr. Edison has accomplished. With regard to the mercurial electric light, which a correspondent in this week's issue calls attention to, we must give a strong caution against any attempts being made to revive that light. It nearly caused the death of its inventor, and in less capable hands would, no doubt, prove fatal. Sufficient outcry is made about the presence of carbonic acid in rooms where gas is burned, but what would be said if the atmosphere of an apartment were impregnated with the vapour of mercury?

A very interesting speech was made by Sir Julian Goldsmid, Bart., M.P., at the half-yearly meeting, last Tuesday, of the Imperial Continental Gas Association. He naturally dwelt a good deal on the relations of the electric light to gas, and what he said on the subject may be accepted with confidence, for he has given much attention to the matter, and is especially well informed on what has taken place in Paris.

It appears probable that Parliament will be much occupied in the coming session with measures relating to the supply of gas and water. From the notices published in another column, it will be seen that 26 applications from Gas Companies are to be considered. The majority of these Bills are promoted by Companies seeking to be incorporated; but a good number are, of course, for the purpose of obtaining further powers, among which we find authority will be sought to supply electricity or any source of light other than gas. Corporations possessing gas undertakings are also promoting Bills in considerable numbers, and we observe that they nearly all seek powers to apply the electric light for the illumination of public spaces. One Corporation—that of South Shields—who have no gas undertaking, go boldly in for electricity alone, thinking probably that if they can only get the power asked for they will ruin the Gas Company. Two Electric Light Companies ask for authority to break up the streets and roads for the purpose of laying down cables and service-wires. What the Postmaster-General will have to say to the proposal to crowd the soil under our pavements with wires conveying electricity we do not know, but we have a strong suspicion that some objections will be raised. At the present moment no one disturbs the London pavements so often as the Postmaster-General. What would be said if Gas and Electric Light Companies should ever compete for the possession of the pavement, may be readily guessed. There is, however, no fear of such rivalry for very many years to come. In addition to the Bills referred to above, there are 24 applications to the Board of Trade for Provisional Orders, under the Gas and Water Works Facilities Act, 1870.

The owners and ratepayers of Exeter have, at a statutory meeting under the Borough Funds Act, refused their sanction to the promotion of a Bill by the Town Council to confirm their agreement for the purchase of the works of the Exeter Gas Company. A poll has, of course, been demanded; but the decision of the meeting is not likely to be reversed. The case is a somewhat peculiar one, and we are afraid it will give rise to some ill-feeling in the City. The bargain made by the Town Council with the Company last session was clear and explicit. The terms of purchase arranged between them cannot be said to have been extravagant. There was fair value for the money, with excellent prospects in the future. Nevertheless, it cannot be denied that the works require a certain amount of reconstruction, and some enlargement. This the Company are perfectly competent to do; as the Council must, if, in the end, they obtain the works. There is excellent scope in Exeter, and we have no doubt that, in the hands of the Corporation, the works would have prospered. It seems, however, that the bugbear, the electric light, has scared the worthy people of Exeter from concluding a fair bargain. The Company will retain their undertaking, and will, of course, continue to make good dividends. By-and-by, when the electric light is a half-remembered splendour, and the capital of the Gas Company has been doubled, another generation of ratepayers may regret that their parents did not avail themselves of the opportunity offered to them. For ourselves, we are not at all sorry that the purchase has fallen through. The Company can well hold their own, and the Shareholders may resignedly accept the situation.

We regret to see that the Town Council of Leeds have resolved on withdrawing, from the Improvement Bill they are promoting, the clause which was intended to give them power to manufacture, lend, let on hire, or sell gas-cooking stoves. The opposition was evidently raised by the tradespeople of the town, who feared that the Corporation might become serious competitors. It was, however, we believe, never intended by the Gas Committee to make stoves, but to buy them in the open market.

We fancy we see some better sense prevailing in Hereford. An opinion is growing up that, after all, the electric light will never be a formidable rival, and that the gas-works are inadequate for the supply of the city and district. We should not be surprised to learn that the Town Council have rescinded their resolution to postpone the erection of the new works for three months, and have ordered their construction to be proceeded with at once.

The Corporation of Liverpool and the two ratepayers have made their customary application to the Recorder of Liverpool for the appointment of an Auditor of the accounts of the Gas Company. As no action was taken on the last audit, we may presume that everything was found straightforward. The Recorder seemed to think that these audits might become very expensive, but as he acquitted the Corporation of any desire to prejudice the Company, he at once reappointed Mr. M'Quie.

Water and Sanitary Notes.

WATER Bills will be tolerably numerous in the coming session. Seventeen Companies are applying for incorporation or extended powers. There is only one Bill which has anything like an unusual appearance, and that is promoted by the Weardale and Shildon Water-Works Company, who, perhaps, are seeking to invade the district of the Durham Water Company. Without knowing the whole circumstances of the case, we may take it that the best thing these two Companies can do would be to join interests and amalgamate. There is no doubt that the citizens of Durham are discontented with the present supply, but the Durham Company are in a strong position, and could withstand the attacks of the Corporation; yet if there be in the district a Company with better water, and a supply adequate in quantity, the best thing that could be done would be to get the better water, and conserve the present distributing plant.

We notice that the Corporation of Nottingham are about to make another attempt to purchase the undertaking of the Nottingham Water-Works Company. How far this will be resisted by the Company we do not know. If anything like a compulsory purchase be attempted, we feel satisfied that the Corporation will not succeed. There is nothing to be alleged against the Company, who supply excellent water in almost unlimited quantity. If the Corporation can make fair terms with the Company, all well and good. The Shareholders may not suffer, but the borough and neighbouring districts will never be better supplied than they are at the present time.

We need only mention here that the notice of the Metropolis Water Purchase Bill, promoted by the Metropolitan Board of Works, has been published in due course. Whether the Bill will ever get beyond a first reading remains to be seen.

The Corporation of Derby have also published, in due course, their notice of a Bill to acquire, by compulsion or agreement, the undertaking of the Derby Water-Works Company. Here is another case in which, if a fair agreement be not come to, there must be a long parliamentary contest.

The notice of a Bill to enable the Corporation of Manchester to carry out the Thirlmere scheme has also been published in the *Gazette*. We have before expressed an opinion, which means a hope, that the measure will be successful this year.

Five Bills will be promoted to enable Local Authorities to undertake drainage schemes. The most important of these is that which is to enable the Joint Board of the Lower Thames Valley to carry out the scheme which has been propounded by Lieut.-Col. Haywood. Scarcely of less importance is the measure which is intended to authorize the extension of what is known as the West Kent Main Drainage scheme, which is intended to collect the sewage of various towns and districts in West Kent, and, after treatment by chemicals, turn it into the River Thames, at a point considerably below the present Metropolitan outfalls. The difference between the two schemes is, that in the last-mentioned but little attempt will be made to utilize the sewage, while in the former a sewage farm and intermittent downward filtration are proposed, which may or may not turn out to be profitable. Much opposition may, however, be raised to this scheme when it gets into the House. The other two schemes relate to comparatively small country districts; but we may just mention that of the Dudley Corporation, who seem to have made arrangements with the Earl of Dudley for the utilization of their sewage upon a part of his settled estates.

In addition to the Bills referred to above, there are eleven applications from Water Companies to the Board of Trade for Provisional Orders under the Gas and Water-Works Facilities Act, 1870.

The Lambeth Water-Works Company are evidently in a fairly prosperous condition. The report of the Directors presented at the last half-yearly meeting, and which we publish in another column, shows that they are able to pay a dividend at the rate of six and a quarter per cent. per annum, and carry forward a balance of £3055. The contingency-fund also profited by the allocation of £2500. The business of the Company necessarily increases, and during the past half year 1441 new services, calculated to produce an income of £3009, were laid. The works of the Company appear, on the whole, to be in admirable order; but a Government Examiner would scarcely earn his salary if he did not find some fault, and thus the Lambeth Company are laid at charges to prevent what was considered the too rapid filtration of their water. It is gratifying to notice that a constant service is being introduced into their district as fast as practicable, inasmuch as it is the most difficult in London in which to carry out a constant high-pressure service.

The Metropolitan Board of Works seem desirous of ascertaining for themselves the actual state of the River Thames near the sewage outfalls. They charter a steamer, take some bottles and a cord, and fish up samples of water at various points. Nearly all are turbid, but have no smell. A few others are very turbid, and stink. But some special excuse is found for this. It is not sewage that communicates the stench, but refuse from certain chemical works which lie some distance off. We do not know whether or not the Board are going the right way to ascertain what is the actual state of the Thames. We will wait until we learn what was done last Saturday, when the Board again went down the river to feel for the mud-banks, which, it is said, exist near the outfalls.

The Metropolitan Board of Works have determined to introduce the Bill they promoted last year for the prevention of Thames floods. It is, as our readers know, to compel all Riparian Proprietors and the Authorities lying along the banks to execute the necessary works at their own charges. This scheme will, we feel certain, be rejected as before. The prevention of floods is a matter of general Metropolitan interest, with which, it may be said, all the ratepayers are concerned. There may be individual cases, in which the owners of property on the river banks may be expected to protect themselves; but the protection of the low-lying districts inhabited by the poorer classes should, to our minds, be made a Metropolitan charge. There are many who share the view we have expressed, and we may predict another failure for the Bill once more to be brought forward.

THE METROPOLITAN FIRE BRIGADE AND THE WATER COMPANIES.

Recent proceedings on the part of the Metropolitan Board of Works with reference to the Fire Brigade, have excited considerable dissatisfaction, especially in the City. The removal of the head-quarters of the Brigade from Watling Street to the Southwark Bridge Road would be sufficient of itself to cause some anxiety; but, in addition to this removal, there has been a general reduction in the *personnel* and the *matériel* of the Brigade within the City boundaries. Thus we find it stated that, whereas in May, 1873, there were four fire-engine stations in the City, besides the training-school for firemen at Whitefriars, there are now only three stations, the number of men being also reduced from fifty-six to twenty-three. The Metropolitan Board have indulged in the notion that, whatever deficiency was thus created in the City, was more than counterbalanced by the creation of the powerful central station in the Southwark Bridge Road. Common experience, however, seems to tell us that there is a great practical difference between one side of a river and the other, even when there is a good bridge to span the stream. If a station in the Southwark Bridge Road is practically as effective for the protection of the City from fire as one in Watling Street, we might suppose that the old railway terminus at London Bridge was as convenient for a City man as the more modern railway station in Cannon Street. At all events, we might say it could never be worth the while of a Railway Company to expend an enormous sum of money merely for the purpose of transferring a station from one end of London Bridge to the other. But everybody knows the utility of being on the right side of the river, and the superior cheapness of a site in Southwark, compared with one in the City, is in itself an indication of the fact. A central station in Watling Street could not be enlarged so as to answer the purpose of a drill-ground, a factory, and a depôt, except at an enormous expenditure for the space occupied. Perhaps, not even the Holborn Valley could afford a sufficient area at any other than an extravagant cost. But, allowing that the central character of the Watling Street station was necessarily sacrificed, we cannot at the same time approve of the reduction of that station to the very verge of extinction. Beyond this we have to consider the fact that the Brigade has been in a great measure withdrawn from the City, so that there has been a weakening of the force at all points within its boundaries. Bringing a great force together in Southwark cannot be deemed a sufficient compensation for this loss of power within the circle. The Thames itself is in no particular danger of being set on fire, yet, by placing the strongest fire-engine station on the southern side of the river, the Metropolitan Board have interposed between that station and the City an area which requires no watching at all, and over which the engines can pursue no diagonal course, so as to aim directly at the seat of a fire which may lie to the right or left of the line of the bridge.

It is impossible to view with unconcern any arrangement which reduces the safety of the City in the prospect of fire. But the subject becomes doubly important owing to the relation which it bears to the broader question of protecting the whole of the Metropolis. It would appear that the construction of this great central station imposes a drain on the resources of the Metropolitan Board which necessitates a withdrawal of the Brigade from other points. In the City much alarm has been manifested, and the matter has been taken up publicly, the last phase being a deputation to the Home Secretary. So serious is the aspect of affairs, that the Insurance Offices have made a representation to the Board, asking that a steam fire-engine should be placed at the Watling Street station. In receiving the deputation from the City, Mr. Cross said he had previously communicated with the Metropolitan Board, and had received an answer that the subject was already under consideration. It has since appeared that on the day Mr. Cross received the deputation, the Works Committee of the Metropolitan Board had drawn up and signed their report "On the Protection of the City of London from "Fire." That report was produced at the next meeting of the Board, and, having been adopted, a letter from the Home Secretary was subsequently read, enclosing a copy of the memorial presented by the deputation, and requesting to be furnished with the observations of the Board thereon. It was thereupon agreed that a copy of the report by the Works Committee should be forwarded to the Home Secretary, and no sign was given that anything more was thought necessary, although the report of the Committee contained no allusion whatever to the memorial or the deputation. Of course, the report may be taken on its own merits, and the Board, doubtless, think that the recommendations it contains are sufficient for all purposes. But the speech of Mr. E. Dresser Rogers, the Chairman of the Works Committee, is significant, as showing the precise ground on which the Board take their stand. It is not so much pretended that the City, or the Metropolis at large, is adequately protected against fire, as that the Metropolitan Board do the best they can with the money placed at their disposal. This is the key to the whole affair. The Board have a limited though growing income for Fire Brigade purposes, and they simply "cut their coat according "to their cloth." The public are not satisfied with the result, and the Board plead in reply that they can really give no more for the money. Looking into the report—which is to be taken as a sort of ultimatum—we find it to possess a very limited scope. Orders were given in August last for 40,000 feet of hose, to be used in connection with the new City hydrants. So far so good; but the Board had nothing to do with putting down these hydrants, the entire cost being borne by the Civic Authorities. We gather from the report—though not very clearly—that it is the intention of the Board to station firemen at suitable points in the City, such firemen to be in readiness with appliances for using the hydrants in the event of fire. Captain Shaw, we are told, "suggests twenty places in the City of London, in "addition to the present fire-escape stations, where firemen with "appliances might suitably be stationed," so as to turn the hydrants to the best account. It may be that the hydrants, existing and prospective, have encouraged the Metropolitan Board to denude the City of so many engines and men. But if the putting down of hydrants is of so much practical value within the limits of the City, something of the same kind might be done elsewhere, on the many miles of streets, containing mains constantly charged at high pressure, beyond the civic area. This, however, the Board have never been disposed to do; neither would the City have possessed its hydrants, had not the Corporation taken the matter in hand. Thus, in addition to contributing to the halfpenny fire brigade rate of the Metropolitan Board, the City is taxing itself to lay down hydrants, the Metropolitan Board kindly coming to the rescue with 40,000 feet of hose. This sort of clubbing together is satisfactory, as showing that the two great local powers are capable of working unitedly

for the public good. It is only to be regretted that the Metropolitan Board are taking away with one hand what they are giving with the other, and are removing men and engines while they are giving hose.

Proceeding with the report of the Works Committee, we meet with an acknowledgment that "a station might advantageously "be placed in the neighbourhood of Farringdon Street or "Ludgate Circus;" and they recommend the Board to instruct the Fire Brigade Committee to endeavour to obtain a suitable site for that purpose. "With this new station," the report says, "and with the distribution of fire-extinguishing appliances and "men throughout the City, as recommended above, in connection "with the hydrants, your Committee are of opinion that the "arrangements for the protection of the City from fire will be all "that can be desired, and certainly much more effective than at "any previous time." Nevertheless, "as a concession to the views "of the Fire Offices," it is recommended that a steam fire-engine be placed at Watling Street, "until the permanent "arrangements to be made there are decided on." Following this report, we have one from the Fire Brigade Committee, presented at the last meeting of the Board, recommending that there should be an increase of twelve men in the force available at night for the protection of the City, and that a "moveable "station" should be placed in Farringdon Street or Ludgate Circus, to be followed by others at the Post Office and elsewhere. A steam fire-engine on a raft, to be drawn by a tug-boat, is also to be employed on the river in addition to the present floating engines. Taking the two reports together, we see what are the measures the Board are about to carry out. Appealed to from various quarters, they have yielded, and wisely resolved to make good use of the hydrants, although it has been made to appear, on former occasions, that such contrivances would be of very little service, owing to an alleged deficiency of pressure and capacity in the mains. Taking the entire scheme in connection with the remarks of Mr. Dresser Rogers, we find it is based on two considerations—"first, "that the Metropolis should be rendered as safe as possible; "and, secondly, that the cost should not exceed the halfpenny "rate." This evades the question whether the halfpenny rate is enough. We also venture to suggest that there is a third consideration—namely, that the Board shall have as little as possible to do with the Water Companies. If hydrants are to be of service in the City—and it will be observed that the Board plead such to be the case—they would be of service in those districts where they might have been placed long ago, if the Metropolitan Board would have condescended to do as the City Authorities are now doing, and co-operate with the Water Companies. Captain Shaw has just told the Metropolitan Board that "several fires have been put out by means of these hydrants "alone," in the City. Turning to Colonel Bolton's last monthly report, addressed to the Local Government Board, we find that in the district of the New River Company there are 201 miles of streets containing mains constantly charged. The New River Company supply the City; but elsewhere we have the East London, the Kent, the Southwark and Vauxhall, the West Middlesex, the Grand Junction, the Lambeth, and the Chelsea, possessing between them over 500 miles of mains, on which hydrants might be affixed. Of 4656 hydrants already existing, only 783 are for public use, independent of 475 in Government establishments. From time to time the Companies communicate to the Metropolitan Board their progress in extending a constant supply, and the Board take as much notice of these communications as if they were mere effusions of the imagination.

This desire on the part of the Board to keep at a distance from the Water Companies, finds illustration in a report presented by Captain Shaw as far back as December, 1871. In that report, Captain Shaw says he has reason to believe that the Water Companies are "not with the same means of assisting "each other in cases of emergency" by connecting their mains; but he goes on to state—"As the Committee," apparently of the Fire Brigade, "seemed to be unwilling that I should place "myself in direct communication with them"—meaning the Companies—"I have only been able to consult such turncocks "and inspectors as I have recently met at fires." Let us imagine the Chief Officer of the Fire Brigade thus trying to fish up evidence from promiscuous turncocks and inspectors, when it only required a letter from the Metropolitan Board to the Water Companies in order to obtain authentic information first hand! It is not as though the Board could plead any want of courtesy or candour on the part of the Companies, and Captain Shaw acknowledges that so far as he had anything to do with these bodies, he always found them ready to co-operate with him in every possible way.

Without any desire to take up a mere popular cry against the Metropolitan Board, we venture to say that the Board have not dealt fairly by the Water Companies in reference to the fire question, neither have they displayed a policy worthy of their high responsibility as guardians of the public safety. Years ago the Companies offered to pay the rent for lodgings to accommodate the turncocks on the premises at the several fire-engine stations, so that there should be no loss of time in turning on the water when an engine reached the scene of a fire. But the offer was declined, and the same spirit of inertia has been shown on other occasions. There was, indeed, one period when the authorities at Spring Gardens broke through their silent and exclusive system. Four years ago they addressed a communication to the Water Companies of the Metropolis, asking whether something could be done to prevent the delays which, "even "with the best efforts of the Water Companies, occasionally "occurred in obtaining a supply of water at fires." This inquiry was accompanied by certain proposals, not very practical in their nature, or likely to be of much service. The Directors of the East London Company stated, in their reply, that they had "received these suggestions and inquiries with profound aston-"ishment;" and we believe the same feelings prevailed among the Directors of the London Water Companies generally. There was great reason to be surprised, for the East London Company had written to the Board, one or two years before, offering them assistance of the very nature which they now solicited, and to those communications the Board simply returned a bare acknowledgment of their receipt. The East London Company, in replying to the unexpected inquiry from the Metropolitan Board, drew their attention to the past, and concluded a lengthy letter by saying, "It is well that the public "should know with whom rests the responsibility of with-"holding the proper means for the extinction of fires, the "opportunity for supplying which has thus been so repeatedly "brought under notice." This spirited rejoinder was at once acknowledged; but the actual reply did not arrive until February, 1876, or after a lapse of thirteen months. Let us not talk of "delays at fires!" There was also the fact that the Company had raised the question as far back as December, 1872. In explanation of their long silence, the Board stated that they had been directing a careful house-to-house investigation as to the working of the constant supply. This, however, was outside the hydrant question. The question was not merely as to the supply of water to a man's house, but how best to provide water to keep his house from being burned down. In respect to the hydrants, the Board had this to say, as the result of their own inquiries, and as being the opinion of their Engineer, that, for the purpose of extinguishing fires, hydrants "would not be of real "practical advantage to the Board, unless a sufficient pressure of "water were insured," and this it was considered could not be obtained, "so long as the management of the water supply "remained under the independent control of different Com-"panies." To this the Company replied that hydrants on the main were better than plugs on the service-pipe, and the existing pressure was sufficient to be of real value. Moreover, the hydrants if once erected, would be of use, whether to the Companies or to the Municipal body, which it was thought might supersede them. More than two years have elapsed since the date of the foregoing correspondence. In the interim we have seen the Metropolitan Board propound a scheme of their own for a dual water supply, one set of pipes to convey a constant service under pressure. But the project was generally disapproved, and died a quiet death in Parliament.

The policy pursued by the Board on this question is not wise, having regard to their own *prestige*, nor can it be justified as it affects the public interest. Their own credit is at stake, and it may even prove that they are forcing the water question into a phase which threatens their own existence. We have not referred in this article to the sanitary features of the water supply; but we find the Board pursuing the same course in that particular as in regard to the use of water for extinguishing fires. They will not put forth their energies to improve the existing state of affairs, unless everything is placed in their hands. They are waiting until they can get power to buy up the Water Companies; but they seem unconscious of the risk that possibly the water supply may pass into other hands than their own. Their management of the Fire Brigade, in relation to the water supply, has not met with the approval of Parliament. Select Committees have more than once reported in favour of hydrants, and yet the Board have shown the utmost unwillingness to adopt these appliances. So also we find the Board stinting the force of the Brigade, cutting down some of their stations, and abolishing others, although Parliament is evidently willing to give them a penny instead of a halfpenny rate, if they will but ask for it. Parliament is willing to grant certain things, but the Board ask for something else, and so nothing effectual is accomplished. Now, at last, in respect to the fire stations in

the City, the Board have taken a step which pleases nobody except themselves, and the outcry has been so great that they have been compelled to alter their plans. But much more remains to be done. There is plenty of water for the extinction of fires, but the Board must furnish the means of using it, and they must make the best of their opportunities for the public good, both in and out of Parliament. Should a disastrous conflagration of unusual magnitude befall the Metropolis, the result might not be very agreeable at Spring Gardens. In this matter we seem to have Parliament, the Public, and the Water Companies on one side of the question, and the Metropolitan Board on the other.

Correspondence.

[*We do not hold ourselves responsible for the opinions expressed by Correspondents.*]

THE EDISON ELECTRIC LIGHT.

Sir,—Until the happy day arrives when we poor miserable gas shareholders are privileged to know exactly what we have to face in Mr. Edison's wonderful discovery in connection with the electric light, we must perforce be satisfied with the meagre details which we have as yet been permitted to know. The principal of these is that in Mr. Edison's system the light is to be obtained by the incandescence of platinum wire. I am old enough to remember the early history of this light, and, with the enthusiasm of a stronger belief in its capabilities than I now possess, have watched with keen interest every suggestion for its improvement, and the overcoming of the objections to its use. Going back in memory about 20 years, this *novelty* reminded me of the Vicar of Wakefield: "Excuse me, but I think I have heard all this before," and in a better arrangement—viz., by a minute stream (or wire, if it may be so called) of mercury flowing through a small hole from one reservoir to another between the poles. The electric light impinging upon this produced combustion, and consequent oxidation of the metal. It at the same time greatly enhanced the brilliancy of the light, while the reduced oxide could, by sublimation, be again returned to its fluid state, thus theoretically reducing the consumption of mercury to *nil*. But, alas! this infant, promising as it was, appears to have been smothered in its birth, as I could never find that it had been practically adopted to the smallest extent. I cannot help suspecting that, if the whole secret is to be this incandescent platinum, a similar fate awaits its introduction.

16, *Green Park, Bath, Nov.* 26, 1878. Robert Biggs, M.R.C.S.

GAS COMPANIES AND THE SUPPLY OF THE ELECTRIC LIGHT.

Sir,—Is there not some little appearance of disagreement between the first and fourth paragraphs of the "Circular to Gas Companies" in your Journal of Nov. 26? Unless, indeed, it is implied that, although such a general monopoly would not be an unreasonable and indefensible concession to those who have risked so much, and have served the public so well, yet it is not at all likely that Parliament will sanction it; and with that view I entirely agree. But, as I said in the few words which, at the request of the Secretary, I addressed to the recent meeting of the Gas and Water Companies Association, I am by no means sure that it would not be good policy for the gas companies to unite in applying for a general Act, conferring such an extension of powers or privileges as you are recommending companies who happen to be going to Parliament for other purposes to get inserted in their special Acts. If the new light is to be much used—as it may be, although I have no fear that it will be a generally successful competitor with gas—it would be only fair that gas companies should not be excluded, by the terms of their special Acts, from supplying it, and that the exercise of such extended privilege should not be deferred until the investing public generally have been led to risk their capital in the numerous new and independent ventures that are likely to crowd the lists of the mart of speculation. Robert Phelps.

Cambridge University and Town Gaslight Company, Nov. 28, 1878.

COKE-STOVES.

Sir,—Can you or any of your readers inform me whether any of the various kinds of apparatus for heating by coke, as exhibited by the Paris Gas Company at the recent International Exhibition, can be obtained in England?

If the makers of gas-stoves would give their attention to the production of coke-stoves, similar to those made by the Paris Gas Company, they would confer a boon on Gas Managers, by helping to relieve them of their ever-increasing surplus of coke.

Dover, Nov. 28, 1878. R. H. Jones.

SCREENED AND UNSCREENED GAS COALS.

Sir,—I shall be obliged if you or any of the readers of your Journal will state what is the difference, as far as they have tried it, between using screened or unscreened coal for gas-making. I have for some years bought the best sorts of Newcastle unscreened gas coal, but always find, by the time I get the coals here, that there is a large quantity of it as small as dust. I have decided to try the screened coal, but am told that, by the time I get it here, I shall see no difference, as it is so soft that it is sure to get powdered up; but I cannot think so, and shall be glad to have the opinion of those who have more experience in the working of gas coals than I have.

Gas Office, Paignton, South Devon, Nov. 29, 1878. Henry Murch.

THE HEREFORD CORPORATION GAS-WORKS.

Sir,—In your last publication you comment upon the postponement of the erection of our new works, and in doing so I think you have unintentionally done me an injustice. You say, "The undertaking has never been very profitable to the Corporation, nor is it likely to be, unless managed with more energy." I believe if you knew all the facts, you would consider that, so far as the management is concerned, I have used more energy than is usually expected, even in this our line of business; otherwise the city would have been in darkness on many occasions during the winters of the last five or six years, owing to the plant being too small for the increased consumption.

This I pointed out to the late Company in the year 1870; and at their annual meeting in May of that year they decided to expend the sum of £3400 in enlarging and improving their plant. The retort-house had been in use since the establishment of the works, in the year 1824, and had become too small, besides, being in a very dilapidated state, it required the first attention. This was consequently taken down, and a larger one erected, with modern fittings, upon an extended site, at a cost of some £1500. Before this was completed, the agitation for the purchase of the works by the Corporation commenced, consequently the Company did not proceed further.

Upon the works passing into the hands of the Corporation, on July 1, 1872, I directed the attention of the Gas Management Committee to the necessity for increasing the whole of the plant between the retort-house and the consumers. They immediately took the matter into consideration, and, with a view to carry out my recommendation, endeavoured to purchase about ¾-acre of land adjoining, belonging to the Joint Railway Companies. This we found no easy matter, seing that there were three distinct Boards of Directors interested, and, to add to the difficulties, a new central station was (and still is) under consideration, and, until that was decided, they declined to sell; consequently, we had to work on as best we could. At length it became evident that, even if we obtained the land we had been so long vainly trying to purchase, and expended, as we must have done, some £15,000 upon it, in a few years a new site must have been resorted to, entailing the expense of keeping two works going, or the sacrifice of a much larger sum for the abandonment of the present site.

A suitable piece of land being in the market, I recommended the purchase. The opinion of Mr. G. W. Stevenson was taken, and he supported me in my proposition. The Committee immediately took the necessary steps, the land was purchased, and proceedings for the erection of the works were commenced and were going on well until this bugbear, the electric light, upset the gravity of the citizens generally—as it has done others in many parts of the country beside. The result is the further progress of the work is postponed for three months.

With these facts before you, I think you may safely withdraw the paragraph I allude to, and give the Gas Management Committee and myself a little more credit for energy, and rest assured when we do get works capable of supplying a larger quantity of gas, we shall not be unmindful of the advantages to be derived from an exhibition of the modern appliances to promote day as well as night consumption, and thus increase the already not-to-be-despised profits of the undertaking.

William Davis, Engineer and Manager.

Gas-Works, Hereford, Nov. 29, 1878.

[In the paragraph to which allusion is made above, we never intended to impeach the conduct of the Engineer; but we still hold to the opinion that the Gas Management Committee have not displayed all the energy they might in the matter.—Ed. J. G. L.]

Brighton Corporation Water Supply.—Last Wednesday an important addition to the scheme for supplying water to Brighton was thrown open for the inspection of the ratepayers, by direction of the Corporation, who, since they purchased the works, have developed them in a manner far beyond what was at one time thought necessary, additional tunnels having been driven in the chalk formation, a new engine erected, and a new well sunk, the whole costing between £30,000 and £40,000. The portion shown in its complete state last week, being the conclusion of the work, was the new well, which is sunk to the depth of 170 feet, and has a diameter of 14 feet by 11 feet. The carrying out of this section of the scheme has made the resources of the Corporation as complete as possible, as, by the duplicate system, they are enabled to supply the town by either of their two engines, thus providing against a breakdown. The tunnels, which extend over a large area, are driven parallel to the sea, and, by intercepting the rainfall as it makes its way seawards, yield an almost unlimited supply—enough, in fact, to supply the town twice over.

Chertsey Gas Consumers Company, Limited.—The sixteenth annual meeting of this Company was held on Thursday, the 21st ult.—Mr. J. Bartholomew in the chair—when the Directors report, read by the Secretary and Manager (Mr. John Moir), was unanimously adopted. It stated that the revenue account had fully justified the policy of the Directors the previous year in making a reduction in the price of gas to the consumers, as the amount at their disposal for dividend and other purposes showed an increase upon the previous year of £265 1s. 6d., which, with the balance, made a total of £1297 3s. 9d. After careful examination, and considering the position of the Company in all its bearings, the Directors felt pleasure in being in such a sound position, and had unanimously agreed to recommend a dividend of 10 per cent. per annum, free of income-tax, which would absorb £790, leaving a balance of £507 3s. 9d. to be carried to the current account. At the same time it was equally pleasing to the Directors to announce a further reduction of 3d. per 1000 cubic feet to the consumers, to take effect from the 1st of January next, which they trusted would, as heretofore, lead to an increased consumption. The Directors felt sure the Shareholders would expect a few words from them as to the future prospect of the consumption of gas, in consequence of the alarm lately caused by the formation of Companies to promote the use of the electric light. The Directors had no hesitation in saying that, should eventually electricity supersede the use of gas for lighting purposes, it would certainly be required for many others. Even the promoters of the electric light stated that if they were able to bring it into some commercial shape they would wish to avail themselves of gas as a motive power. If they did that, and as it was the most convenient and probably the cheapest means for the purpose, the consumption of gas would far exceed that now required for lighting purposes. The called-up capital of the Company is £7900, and £1500 has been borrowed. During the year ending the 30th of September last, £2295 was received from the sale of gas; lighting inspectors, public lamps, residuals, and sundries, £926 19s. 4d. The total outlay in the production of gas was £2245 18s. 7d. A vote of thanks was passed to the Directors, whose remuneration was fixed at 60 guineas. Captain Dyer was re-elected Auditor, and the retiring Directors (Mr. J. Bartholomew and Mr. M. Shurlock) were re-appointed, Mr. A. Wort taking a place at the Board in the room of Mr. Longhurst. Votes of thanks to the Secretary and Manager, and to the Chairman, terminated the meeting.

Parliamentary Intelligence.

NOTICES GIVEN FOR PRIVATE BILLS (SESSION 1879) RELATING TO THE SUPPLY OF GAS, WATER, Etc.

AIRE AND CALDER NAVIGATION (GOOLE GAS AND OTHER LIGHTING).—Power to undertakers of navigation of Rivers Aire and Calder to manufacture and store gas; to maintain and improve existing gas-works, and construct and maintain new works; to distribute and supply gas; to manufacture, convert, &c., residual products; to acquire, sell, and lease lands, hereditaments, and easements; to lay mains and pipes, and to open roads, &c.; to manufacture or provide meters, &c.; to deal in gas, coal, coke, and residual products; to sell their gas-works to, or enter into contracts with Local Authorities, bodies, and persons; to acquire patent rights, &c., and to apply their funds to those purposes; powers to Local Authorities and bodies to apply their funds; regulation of price and quality of gas, and of dividends; power to supply light by electricity or other means; separation of accounts; incorporation and amendment or repeal of Acts; and other purposes.

ALDRINGTON WATER.—Incorporation of Company; construction of works; supply of water to the parishes of Aldrington and Portslade, in the county of Sussex, or part or parts of same respectively; rates and charges; purchase by agreement or compulsion of the undertaking of the Shoreham and District Water-Works Company, or some portion thereof; provisions as to supply of water, in bulk or otherwise, by the Corporation of Brighton, the Shoreham and District Water-Works Company, and other Sanitary or Local Authorities; powers to the Corporation of Brighton to acquire the undertaking of the Company; amendment or repeal of Acts.

ALLIANCE AND DUBLIN CONSUMERS GAS.—Purchase or acquisition of lands, by agreement or compulsorily; construction of tramways, and provisions relating thereto; coal sheds or warehouses; portable gas for tramways, &c.; increased powers to inspectors of meters; powers to Company to manufacture and deal in heating and cooking apparatus; gas-engines and other apparatus for heating and producing light, and to use the same; to acquire patents, to levy rates and charges, and to apply the funds of the Company for the purposes of the Bill; agreements with public bodies and others; incorporation and amendment of Acts; and other purposes.

ALTRINCHAM GAS.—Conferring additional money powers on the Altrincham Gas Company for the purchase or acquisition of lands, by agreement or otherwise; maintenance of existing works and new works; manufacture and storeage of gas or other means of producing artificial light, and conversion, &c., of residual products; additional powers of supply; powers to hold, &c., patent rights, to deal in gas coal, &c.; to purchase, manufacture, hire, &c., meters, fittings, and apparatus; to enter into agreements, to modify existing agreements, and other powers; rates, rents, and charges; incorporation and amendment of Acts; and other purposes.

ARLECDON AND FRIZINGTON WATER.—Power to construct water-works and impound water; supply of water; purchase of lands; levying of rates; borrowing of money; repeal, incorporation, and amendment of Acts; and other purposes.

BARNET DISTRICT GAS AND WATER.—Extension of limits of water supply to include parishes of South Mimms and Enfield, Middlesex, and North Mimms and Northaw, Herts; amendment of Company's Act, 1872.

BELFAST WATER.—Power to the Belfast Water Commissioners to construct additional reservoirs, aqueducts, and other works to afford an additional supply of water to the borough of Belfast and other places; power to take water from Lough Mourne, South Woodburn River, North Woodburn River, Copeland Water, French Park, Duncrue, Beltoy, and other streams; the Whitewell, and other springs; purchase of lands and water by compulsion or agreement; extension of time for compulsory purchase and completion of certain works authorized by the Belfast Water Act, 1874; abandonment of certain works; further powers with reference to supply of water and laying of mains or pipes within and beyond the borough of Belfast and prevention of waste of water; further provisions as to rates; extinguishment of certain easements and rights of way, &c.; sale of certain lands and other property and provisions as to pre-emption; confirmation of agreements; power to apply funds and to borrow additional money; incorporation, amendment, or repeal of Acts; and other purposes.

BIRMINGHAM CORPORATION WATER.—Extension of time for completion of works; further provisions as to supply, misuse, waste, and fouling of water; power to prescribe, and test, and supply fittings; to make bye-laws; to levy water-rates; to borrow money, and to make provision in respect of the mortgage debt of the Birmingham Water-Works Company; investment of reserve-fund; service of notices; validity of Council meetings; repeal and amendment of Acts.

BIRMINGHAM GAS (DEFERENTIAL CHARGES REPEAL).—Amendment or repeal of Section 12 of the Birmingham and Staffordshire Gas Act, 1864, and sections 34 and 35 of the Birmingham (Corporation) Gas Act, 1875; alteration of rates chargeable by Corporation of Birmingham for supply of gas; exemption from payment of rates.

BLACKBURN IMPROVEMENT.—Extension of borough, &c.; street improvements; further sanitary powers; power to supply artificial light other than gas; rates, rents, and charges; consolidated stock; borrowing powers; provisions with respect to existing debt; repeal and amendment of Acts; and other purposes.

BLACKPOOL EXTENSION AND IMPROVEMENT.—Extension of borough and of gas limits; electric lighting; additional powers as to manufacture of residual products and supply of gas; alteration of gas limits; purchase of undertaking of the St. Ann's-on-the-Sea Gaslight and Coke Company, Limited, compulsorily or by agreement; price and quality of gas, &c.; consolidation of debts; consolidation, alteration, and extension of borrowing powers; sinking-fund; bye-laws and regulations; incorporation, amendment, and repeal of Acts.

BRIGHTON AND HOVE GAS.—Extension of works; compulsory purchase of lands; confirmation of agreements; powers as to laying of telegraph wires and water-pipes; construction of wharves and approaches; sale, &c., of superfluous lands; acquisition and use of new inventions; manufacture, sale, hire, &c., of engines, stoves, fittings, &c., and levying of rents therefor; application of funds and additional capital; arrangements with Shoreham Harbour Trustees; extinguishment of rights of way; amendment of Acts; and other purposes.

BROMLEY GAS.—Additional capital; borrowing powers; regulation of price for supply of gas; purchase of lands by agreement; agreement with the London, Chatham, and Dover Railway Company for construction of siding; acquisition of patent rights for lighting, &c., and use of additional means of lighting; powers to levy rates, rents, &c.; incorporation and amendment of Acts.

BURY ST. EDMUND'S GAS.—Additional share and loan capital; consolidation of capital, or conversion of same into stock; regulations as to price of gas and rate of dividends; purchase of lands by agreement; powers to hold patent rights, and other powers; incorporation of general Acts; consolidation, amendment, or repeal of Acts.

CARDIFF CORPORATION.—Vesting Cardiff water-works in Corporation; extension and alteration of borrowing powers; altering sinking funds and mode of repaying borrowed moneys; alteration and levying of rates, &c.; amendment and incorporation of Acts.

COLCHESTER WATER.—Extension of limits of supply; regulations for preventing waste and contamination of water; regulation and increase of capital; water-rates and rents; change of name of Company; provisions with respect to Directors, Auditors, and Officers, &c.; incorporation of general Acts; amendment of Act.

COLWYN BAY AND PWLLYCROCHON ESTATE COMPANY WATER SUPPLY.—Supply of water in parish of Llandrillo-yn-Rhos; maintenance of existing works; new works; levying rates and charges; exemption from rates.

CRYSTAL PALACE DISTRICT GAS.—Power to manufacture and supply gas cooking or heating apparatus, stoves, and other fittings, and machinery, &c., for the production of artificial light or illuminating power, and to supply gas for the same; also to acquire and use patents and patent rights; agreements with Local Authorities and others; application of funds; amendment of Acts.

DEARNE VALLEY WATER.—Incorporation of Company; power to construct works and supply water within Hoyland, Nether Swinton, and several other places in the West Riding of the county of York; transfer to Company of powers, rights, &c., of the Corporation of Wakefield, with respect to water-works and water supply within the proposed limits; power to supply water in bulk to Local Boards and others; extension of time for compulsory purchase of lands; power for Company and Corporation of Wakefield, Local Boards, and other Local Authorities to make agreements; amendment of Acts.

DERBY IMPROVEMENT.—Purchase, by compulsion or agreement, of undertaking of Derby Water-Works Company by Corporation of Derby; winding-up and dissolution of Company; power for Corporation to carry on undertaking; to supply water in bulk to Sanitary and other Authorities, &c.; provisions enabling the Corporation to light the borough with electric or other artificial light, and to sell and supply such light, &c.; powers in relation thereto, to break up streets, &c.; new and further powers and provisions relating to the improvement of the borough, &c.; purchase, &c., of lands and property by agreement, &c.; alteration of existing water and other rates; levying of rates; alteration and extension of borrowing and other money powers; to grant annuities, create and issue debentures and debenture stock; amendment of Derby Corporation Act, 1877; amendment and repeal of Acts; and other purposes.

DUDLEY SEWAGE.—Conveyance of sewage to, and discharge upon lands part of the settled estates of the Earl of Dudley; agreements between the Earl and the Corporation.

DUN DRAINAGE.—Powers to borrow further moneys; extension of time for construction of works; compulsory purchase of lands, &c.; alteration of mode of rating and appeal therefrom; publication of accounts; power to vary and amend Act, and rules respecting election of Commissioners; amendment of Act.

EAST RETFORD WATER.—Incorporation of Company; construction of works; supply of water to East Retford; compulsory purchase of lands; power to agree with the Corporation of East Retford, or with any other Corporate Bodies or Sanitary Authorities; and to levy rates, rents, and charges.

ELECTRIC LIGHTING COMPANY.—Power to enter upon and break up streets, roads, &c., and to lay down and set up pipes, tubes, posts, and apparatus for lighting streets and public and private places, buildings, &c., by means of electricity, galvanism, or other similar agency, and to place and carry posts and wires above, over, or under lands, houses, or buildings; agreements with public bodies, companies, &c.; application of funds.

EXETER CORPORATION GAS AND OTHER PURPOSES.—Purchase by Corporation of the undertaking of Exeter Gaslight and Coke Company, and winding up of the Company; powers for Corporation to remove present gas-works in whole or in part, and construct new gas-works, and to purchase lands for that purpose; to light by other means than gas; to acquire patents; to levy rates and borrow money; to sell lands; and to appoint a committee for the gas undertaking; variation of charges for gas, and extension of limits of supply; provisions as to water-meters; notice as to infectious diseases and as to dwellings; repeal, amendment, and incorporation of Acts.

GLASGOW CORPORATION WATER.—Construction, by the Commissioners acting under the Glasgow Corporation Water-Works Acts, of new conduits or main-pipes (temporary and permanent), and temporary staging or bridge in the city parish of Glasgow and parish of Govan, and over and under the River Clyde; compulsory purchase of lands, &c., easements, &c.; additional borrowing powers; application to purposes of Bill of present funds and money of Commissioners; works to be constructed to be taken as constructed under the Glasgow Corporation Water-Works Amendment Acts of 1866 and 1873; application of provisions of these Acts to Bill, &c., and to works to be authorized; extension of time limited by section 20 of the Glasgow Corporation Water-Works Amendment Act, 1866; power to take down, &c., dam or weir across the Clyde; obligation on Clyde Trustees for cost of removal, &c., and for payment of money in respect thereof; power to take water from River Clyde; to supply water for manufacturing purposes, &c.; continuing provisions of the Glasgow Corporation Water-Works Amendment Act, 1876, as to supply of water to parties named and referred to in that Act, or to alter and amend these provisions, or to make new and additional provisions as to same; confirmation of actings of Commissioners; arrangements between Commissioners and persons having rights under the Glasgow Corporation Water-Works Amendment Act, 1866; incorporation of Acts; amendment of Acts; other purposes.

GLOSSOP GAS.—Acquisition of lands and construction of new gas-works; additional capital; extension of limits; levying of rates; supply of any new kind of light; agreements with local bodies; amendment of Acts.

GRAND JUNCTION WATER.—Definition or alteration of scale of voting by Proprietors; qualification of Directors; amendment of Acts.

HOUGHTON-LE-SPRING DISTRICT GAS.—Incorporation of Company; powers to Company to supply gas, &c., to the parish of Houghton-le-Spring, and the townships of Newbottle and East Rainton, &c., in the county of Durham; to purchase by agreement Houghton gas-works, and to hold, maintain, and enlarge, &c., or discontinue gas-works and works for manufacture, &c., of residual products; to confirm agreement of purchase, &c., of said works, and to empower Company to make other agreements with respect to same; to manufacture and store gas and residual products, &c., and to deal in same; to acquire by agreement, and hold, and to dispose of land and hereditaments; to maintain, alter, renew, and to lay down, &c., mains and pipes, and to break up, &c., roads, &c.; to acquire and use new inventions for lighting and heating, and other patent rights, &c.; to manufacture, purchase, hire, &c., gas-meters and fittings, engines, stoves, and other apparatus, and to sell or let same; to levy rates, rents, and charges for gas, and for other lighting and heating agents, &c., and to confer, vary, or extinguish rights, privileges, and exemptions, &c.; contracts with Local Authorities and others for lighting, &c.; incorporation of Acts and other purposes.

ILKLEY GAS.—Increase of capital; powers in reference to the production and use of the electric light, and to sell and purchase gas in bulk; amendment of Acts.

IMPERIAL CONTINENTAL GAS ASSOCIATION.—Extension of powers; amendment of Acts.

INVERNESS WATER AND GAS.—Amendment of Inverness Water and Gas Act, 1875; additional borrowing powers to Commissioners of Police for gas and water purposes, and creation of debenture stocks, annuities, &c.; special guarantee rate and fund for gas mortgages and interest; provisions as to money borrowed and to be borrowed; costs of Act; incorporation of Act; amendment of Acts; and other purposes.

KNUTSFORD LIGHT AND WATER.—Dissolution and re-incorporation of the Knutsford Gas and Water Company, Limited; maintenance of existing works and new works; manufacture and storeage of gas or other means of producing artificial light, and conversion, &c., of residual products; further powers of supply within authorized limits; purchase of lands by agreement or otherwise; powers to hold, &c., patent rights; to deal in gas, coal, &c.; to manufacture, purchase, hire, &c., meters, fittings, and apparatus; to enter into agreements with Sanitary and other Authorities, bodies, and persons, and other powers; share and loan capital; rates, rents, and charges; sale or lease of lands; repeal of the Knutsford Gas and Water Provisional Order, 1871; other provisions; incorporation of Acts, &c.

LANCASTER GAS.—Additional works, lands, capital, and powers; railway sidings; artificial light; patent rights; amendment of Acts; and other purposes.

LEEDS CORPORATION.—Purchase of Hunslet Moor and Woodhouse Ridge, &c.; powers to the Corporation to manufacture, sell, or let gas-stoves, &c.; application and borrowing of moneys; costs of Act; incorporation of Acts; amendment of Acts; and other purposes.

LEICESTER CORPORATION.—Transfer of land, &c.; electric lighting; bye-laws; borrowing powers; consolidation of debts; alteration of sinking-funds, and powers of borrowing and re-borrowing; levying of rates; amendment of Acts; incorporation of Acts.

LIVERPOOL LIGHTING.—Lighting the public streets, places, and buildings within the borough by means of the electric light, or otherwise than by means of gas; power to supply such light in the borough of Liverpool and neighbourhood, and as to use of patent rights; to purchase by agreement the undertaking of the Liverpool United Gaslight Company; to acquire and hold lands, buildings, and easements, and break up streets; to levy rates, rents, and charges; to apply money for purposes of Act; powers to raise money; other powers and purposes; amendment of Acts.

LLANDUDNO IMPROVEMENT.—Abandonment of portion of authorized line of main-pipes; construction of new or substituted works; purchase of lands, &c., compulsorily and by agreement; powers to break up roads, &c.; application of existing funds; further borrowing powers; provisions as to sale of water in bulk; extension of time for purchase of lands, and construction of works authorized by Act of 1876; confirmation of securities granted under Act of 1876, &c.; alteration, amendment, and repeal of some of the provisions of the Llandudno Improvement Act, 1854, and the Llandudno Improvement Act, 1876; incorporation of Acts; and other purposes.

LONDON GASLIGHT COMPANY.—Powers to manufacture and supply gas and other fittings for lighting, warming, ventilating, cooking, and other purposes; application of funds; to levy rents, rates, and charges; extension of provisions of the Gas-Works Clauses Act, 1871; amendment of Acts; and other purposes.

LOWER THAMES VALLEY MAIN SEWERAGE.—Power to construct and maintain pumping-stations and sewerage-works; to take land and easements by compulsion and by agreement; to acquire patent rights; to borrow money; to construct sewers for constituent authorities; powers over and affecting the Rivers Thames, Mole, and Ember, and the Chelsea and Lambeth Water-Works, and the Thames Conservators; amendment of Acts; and other powers.

MANCHESTER CORPORATION WATER.—New works for the supply of water from Lake Thirlmere; special provisions as to lands and mines; provisions as to the supply of water to other Corporations, bodies, and persons; power to raise further money on rates; amendment of Acts.

METROPOLIS WATER-WORKS PURCHASE.—Compulsory sale to Metropolitan Board of Works, and vesting in them of the undertakings of the Metropolitan Water-Works Companies; power to the Metropolitan Board of Works to supply water to the Metropolis, and to districts beyond the Metropolis now included within the limits of supply of Companies whose undertakings are acquired; dissolution of Companies; amendment of their Acts; creation of stock; borrowing, rating, and other powers.

MIRFIELD GAS AND LIGHT.—Extension of limits of supply; change of name of Company; maintenance of existing works and new works; manufacture and storeage of gas or other means of producing artificial light; conversion, &c., of residual products; additional powers of supply; purchase and sale of lands; powers to hold, &c., patent rights; to deal in gas coal, &c.; to manufacture, hire, &c., meters and apparatus; rates, rents, and charges; agreements with public bodies and others; provisions as to share and loan capital; amendment or repeal of Acts; and other purposes.

MORECAMBE GAS.—Dissolution and re-incorporation of the Morecambe Gas Company, Limited; powers for manufacturing gas and residual products, and supplying gas to Morecambe and adjoining townships and parishes; power to supply artificial light; increase of capital; additional land; railway sidings; powers usually conferred on Gas Companies; and other purposes.

NATIONAL ELECTRIC LIGHT CORPORATION.—Power to enter upon and break up streets, roads, and other places, and to lay down and set up pipes, tubes, posts, lamps, and apparatus for lighting streets and public and private places and buildings by means of electricity, galvanism, or other similar agency, and to place and carry posts and wires above, through, over, or under lands, houses, rivers, or buildings; agreements with Public Bodies, Companies, &c.; application of funds.

NELSON LOCAL BOARD.—Power to Local Board to construct new water-works and abstract water, &c.; provisions for protection of gas-meters, &c.; increase of water-rents; power to levy rates and to raise money; amendment of Acts.

NEWCASTLE-UPON-TYNE AND GATESHEAD GAS.—Alteration of rotation of Directors; supply of heating and other apparatus; alteration of testing burner, and mode of testing purity and illuminating power of gas, and standard of purity and power; electric and other lighting, and agreements with public bodies and private persons therefor, with powers to such bodies to levy rates for the purpose; additional lands by agreement; stopping up footpath; additional capital; reserve-fund; alteration of day of general meetings; levying and alteration of rates; sliding scale of price of gas and dividend.

NEW RIVER COMPANY.—Powers to raise further money by share, loan, and debenture stock; regulation of capital; amendment of Acts.

NOTTINGHAM CORPORATION.—Construction of gas-works and purchase of land for same; supply of light by other means than gas; purchase by Corporation of Nottingham Water-Works Company's undertaking, &c.; powers with regard to rates and borrowing of money; amendment and incorporation of Acts.

NOTTINGHAM WATER.—New works; extension of limits; acquisition and use of lands, streets, roads, and thoroughfares; agreements with Local Authorities; incorporation of Acts; amendment of Acts.

OVER DARWEN CORPORATION.—Extension of borough and of limits for supply of gas and provisions affecting the Corporation of Blackburn; powers with reference to the supply of electric or other light, &c.; improvement of River Darwen and other streams, &c.; levying and increase of water and other rates, and further provisions as to the recovery of certain rates and as to discounts; provisions as to borrowing further moneys, and as to existing debts and other matters; amendment of Acts.

PEMBERTON LOCAL BOARD.—Construction of water-works; compulsory purchase of land; impounding of water; amendment of Pemberton Local Board Water Act, 1875; extension of limits of supply; supply to Local Authorities; levying of rates; borrowing of money; repeal and amendment of Acts; incorporation of Acts.

PLYMOUTH AND STONEHOUSE GAS.—Power to provide and supply electric light, or other illuminating power, and to charge for the same; additional capital; amendment of Acts.

PORTSMOUTH WATER.—Power to the Borough of Portsmouth Water-Works Company to maintain works and acquire additional lands; agreements with Havant Local Authorities; further money powers; amendment of Acts.

PRESTON GAS.—Extension of limits: additional capital; electric and other light; powers as to Appleton Row, Preston; other powers; amendment of Acts.

QUEENSTOWN GAS.—Dissolution and re-incorporation of Company, with power to maintain existing works, &c., to construct new road, and discontinue another; regulation and increase of capital.

RATHFARNHAM AND TERENURE TOWNSHIP.—Constitution of new township and powers to Commissioners, &c.; contracts for the supply of gas, or other means of light, and for water supply, &c.; incorporation of general Acts; future extension, and other purposes.

RAWMARSH LOCAL BOARD.—Purchase by compulsion or otherwise, or vesting in Local Board of gas-mains, &c., within their district, belonging to Corporation of Rotherham; supply of gas in bulk by Corporation to Local Board; agreements between them; power to Local Board to manufacture and supply gas, &c.; construction of road; compulsory purchase of lands; power to Local Board to supply gas and water in part of township of Greasbrough; rates, &c.; power to acquire patent rights; money powers; sale of lands intended as site of roads, under enclosure award; amendment of Acts.

ROCHESTER CORPORATION.—Purchase of undertaking of Strood Water-Works Company, and power to Corporation to carry on same; construction of additional water-works, &c.; borrowing powers; making of bye-laws; and other purposes.

ROTHERHAM BOROUGH.—Extension of borough to Local Board districts of Rawmarsh and Greasbrough, township of Brinsworth, and part of Whiston parish, &c.; new sewers, and provisions for disposal of sewage by sewage farms and otherwise; power to purchase and lease lands, &c., and easement in lands, for sewerage, markets, and other purposes; power to purchase patent rights for sewage, to enter into agreements with Local Boards, &c., with respect to sewage, and other provisions in relation to sewers and sewage; provisions as to Rivers Dun and Rother, for cleansing and keeping same free from pollutions and obstructions, &c.; water supply, and waste or misuse of water; amendment of Acts.

SLEAFORD WATER.—Incorporation of Company; construction of works; supply of water to New Sleaford, Old Sleaford, Holdingham, Quarrington, and Kirkby Laythorpe, in the parts of Kesteven, in the county of Lincoln; compulsory purchase of lands and easements; power to levy rates; agreements with Local Authorities and others; incorporation of Acts; and other purposes.

SLIGO BOROUGH WATER.—Revival of powers for the construction of the water-works and the purchase of lands authorized by the Sligo Borough Improvement Act, 1869; supply of water; tolls, rates, and duties; borrowing powers; costs of Provisional Order; amendment and incorporation of Acts; and other purposes.

SLIGO GAS.—Additional capital; supply of electric or other light; amendment of Act.

SOUTHEND WATER.—Dissolution of Southend Water-Works Company, Limited; incorporation of new Company and vesting in them undertaking of Limited Company; powers to supply water in Southend, and certain parishes and places in the county of Essex; powers to maintain existing and construct new water-works and impound waters; agreements with local and other bodies; other powers; amendment or repeal of Acts.

SOUTH SHIELDS EXTENSION AND IMPROVEMENT.—Extension of borough, &c.; lighting by artificial light other than gas, &c.; powers to raise and apply moneys; levying and alteration of rates, &c.; borrowing powers; amendment or repeal of Acts.

SOUTH SHIELDS GAS.—Extension of limits of supply; power to manufacture gas and residual products, and to store gas on additional land; construction of bridge, new street, and other works; purchase of lands, compulsorily and by agreement; purchase of undertaking of Whitburn Gas Company; winding-up and dissolution of that Company; electric lighting; additional capital; consolidation of capital; alteration of rates; deposits; bills of exchange; amendment of Acts.

STOURBRIDGE GAS.—Additional lands; new works; confirmation of contracts; additional capital; levying and alteration of rates; extension of limits; provisions as to artificial light besides gas; other powers.

STRATFORD-UPON-AVON CORPORATION AND LOCAL BOARD.—Extension of borough, &c; purchase by Local Board or Corporation of undertaking of Gas Company, and exercise of Company's powers; agreements between Local Board or Corporation and Gas Company; powers with reference to manufacture and supply of gas, &c.; gas-rates, rents, and charges; dissolution of Gas Company; purchase of lands; interference with roads, &c.; provisions with reference to electric and other lights, &c.; powers of levying and altering rates, &c., for purposes of the Bill; borrowing powers; provisions for costs; amendment, repeal, and incorporation of Acts; other powers and purposes.

THE GASLIGHT AND COKE COMPANY.—Power to manufacture and supply gas and other fittings for lighting, warming, ventilating, cooking, and other purposes; application of funds; to levy rents, rates, and charges; forfeitures and penalties; testing and testing-places; extension of the provisions of the Gas-Works Clauses Act, 1871; amendment of Acts; and other purposes.

TIPTON LOCAL BOARD.—Powers to erect and maintain gas and other works; to purchase, compulsorily and by agreement, and to use lands for gas-works and other purposes; to manufacture gas and residual products; to levy and apply general and special district and other rates; to apply and borrow moneys; incorporation, repeal, and amendment of Acts; and other powers.

WARRINGTON CORPORATION.—Powers to acquire lands, and to erect additional gas-works; to provide and supply light by electricity or other artificial means; to utilize gas-mains and pipes; to charge rates for gas, electric, and other lighting; to supply light to other Authorities, and authorize them to apply their funds; to contract with persons supplying electric or other light; to acquire and use patent rights; to dispose of superfluous lands; limits of supply, &c.; powers to apply corporate funds and revenues; to borrow additional money, and to levy rates and assessments; to make new provisions as to paying off borrowed money, and as to sinking-fund; bye-laws; costs of Bill; incorporation, alteration, and amendment of Acts.

WEARDALE AND SHILDON DISTRICT WATER.—Extension of limits of supply purchase, maintenance, and use or abandonment of works of Durham Water Company; powers to construct new and additional works; to lay and maintain mains and pipes, break up roads, &c.; to purchase, take and use lands, streams, waters, and easements, by compulsion and agreement; to revive compulsory powers to take land; to extend time for compulsory purchase and taking of land, streams, and waters, and for completion of works; to levy rates, rents, and charges; to alter existing rates, &c., and to confer exemption from payment of rates, &c.; to increase and regulate share and loan capital; to alter number of meetings of Company, period for holding same, and the scale of voting thereat; to abandon authorized road diversion of Howle Eele Road, and construct new road diversion; alteration of Sunderland and South Shields Water Company's Acts; altering provisions of the Weardale Company's Acts with respect to compensation waters; to confirm or otherwise carry out agreements with landowners; to hold patent rights, manufacture, deal in, supply and fix water-meters and fittings; to prevent fouling and waste of water; to repeal, incorporate, and amend Acts; to confer, vary, and extinguish rights, privileges, and exemptions; and other purposes.

WESTGATE AND BIRCHINGTON GAS AND WATER.—Incorporation of Company; powers to supply gas and water to Westgate and Birchington; to purchase by agreement the Birchington Gas and Water Works, and to hold, maintain, and enlarge, &c., or discontinue water and gas works, and works for manufacture, &c., of residual products; to confirm agreements for purchase, &c., of said works, and to empower Company to make other agreements with respect to same; to manufacture and store gas and residual products, &c., and to deal in same; new water-works; powers to purchase and dispose of lands, &c.; to lay down, maintain, alter, renew, &c., mains and pipes, and to break up roads, &c.; to acquire and use patent rights, &c.; to manufacture, purchase, and hire gas-meters and fittings, and to sell or let same; to levy rates, rents, and charges for gas and water, &c.; arrangements with Gas and Water Companies; contracts with Local Authorities and others; incorporation of Acts; amendment of Acts; and other purposes.

WEST KENT MAIN SEWERAGE.—Extension of time for completion of works and purchase of lands; power to borrow further money; power to make branch sewers; provisions as to construction of sewerage works without district; as to vesting of easements in Board; power to make sewers in district and for the purpose of outfall without district; as to repair and maintenance of sewers; power to construct ventilators and other necessary works; alteration of representation on the Board and mode of election of representatives; alteration of rates and contributions by constituent authorities and apportionment by Local Government Board; as to appointment, &c., of returning officer; power to levy rates within portion of Metropolitan district and to make agreements for that purpose; payment of costs; amendment and consolidation of Acts, &c.

WISBECH GAS.—Dissolution of the Wisbech Gaslight and Coke Company, Limited; incorporation of new Company, with powers to maintain and enlarge works, and light Wisbech, St. Peter, and other places with gas; alteration of capital; electric light; and other powers.

WOMBWELL LOCAL BOARD.—Purchase by, or vesting in Local Board of undertaking of Wombwell and Darfield Gas Company, Limited; power to Local Board to supply gas or other illuminating power in the township of Wombwell and in the township of Darfield, in the parish of Darfield; to continue and maintain existing gas-works, and to construct others; to levy rates, &c.; to borrow money; to sell or lease lands; to enter into agreements with Sanitary or other Authorities for the supply of gas or other light; amendment of Elsecar, Wentworth, and Hoyland Gas Act, 1863; dissolution of Company, &c.

NOTICES OF APPLICATIONS TO THE BOARD OF TRADE (SESSION 1879) UNDER THE GAS AND WATER-WORKS FACILITIES ACT, 1870.

ALDERSHOT GAS AND WATER.—Additional capital; amendment of Act.

BARNET DISTRICT GAS AND WATER.—Extension of limits of water supply, to include parishes of South Mimms, Middlesex, and North Mimms, Herts; amendment of Company's Act of 1872.

CALLINGTON WATER.—Powers to construct water-works, and to supply water to Callington in the county of Cornwall.

CLEETHORPES GAS.—Additional capital; incorporation and amendment of Acts; and other purposes.

DORCHESTER GAS.—Maintenance of existing gas-works, manufacture and storeage of gas, and residual products; limits of supply; power to manufacture and supply any other artificial light; levying of rates and charges; regulation of capital.

DORKING WATER.—Powers to raise additional share and loan capital, and to extend works, obtain new supply of water, and acquire additional land in the parish of Dorking, in the county of Surrey; incorporation and amendment of Acts.

DRONFIELD GAS.—Power to continue and maintain existing works; to manufacture and store gas and residual products; to lay down mains and pipes and break up streets; to supply gas, gas-meters, stoves, fittings, and gas apparatus, and levy rates and charges therefor; confirmation of existing, and power to make new contracts; incorporation of Acts.

ECKINGTON GAS.—Power to maintain, &c., existing works; to purchase lands by agreement; to supply parish of Eckington with gas; and to raise additional capital.

ENFIELD GAS.—Powers for purchase by Enfield Gas Company of Undertaking of Ponder's End and Enfield Highway Gaslight and Coke Company, Limited, and amalgamation of the two undertakings and enlargement of works; laying mains and pipes, and breaking up streets and roads; additional capital; regulations with respect to terms of purchase; incorporation of Acts; and other purposes.

HAVANT GAS.—Powers for extension of limits of supply; purchase of lands; enlargement of works; laying mains and pipes, and breaking up streets and roads; levying rates and charges; additional capital; regulations with respect to price and dividends; incorporation of Acts; and other purposes.

HERTS AND ESSEX WATER.—Coustruction of water-works; power to supply water in certain places in Herts and Essex; power to take water and purchase lands; rates; agreements with Local and other Authorities and bodies.

LONGRIDGE GAS.—Powers to maintain, continue, and enlarge works for the manufacture and storeage of gas and residual products in the township of Dilworth, in the county of Lancaster; limits of district of supply; power to break-up streets, and to levy rates and charges; incorporation of Acts; and other purposes.

MAIDSTONE WATER.—Additional capital.

MARGATE WATER.—Power to raise additional capital; and for other purposes.

MEXBROUGH AND DISTRICT WATER.—Powers to continue and maintain works; limits of supply; levying of rates and charges.

NORTHFLEET GAS.—Maintenance of existing gas-works; manufacture and storeage of gas and residual products; limits of supply; levying of rates and charges; regulation of capital; additional lands.

OYSTERMOUTH WATER.—Powers to construct water-works in, and supply water to the parishes of Oystermouth and Bishopston, in the county of Glamorgan; taking land and easements; levying rates; agreements with local bodies; incorporation of Acts.

RHYL DISTRICT WATER.—Power to raise additional capital.

ST. ALBAN'S WATER-WORKS.—Power to raise additional capital.

SHOREHAM AND DISTRICT WATER.—Increase of capital; extension of limits of supply; new works; and amendment of Act.

STOURBRIDGE WATER.—Power to raise additional capital, and to supply water in the parishes of Pedmore and Hagley, in the county of Worcester, and Kinver, in the county of Stafford.

THIRSK DISTRICT WATER.—Powers to construct, maintain, and continue water-works, and to supply the townships of Boltby and Feliskirk, in the parish of Feliskirk, and the townships of Thirsk, Sowerby, and Carlton Miniott, in the parish of Thirsk, with water, and to acquire lands by agreement for that purpose; arrangements with Sanitary and other Authorities, &c.; further provision in connection with section 62 of Public Health Act, 1875.

VENTNOR GAS AND WATER.—Power to raise additional capital.

WANTAGE GAS.—Power to maintain and continue gas-works, to increase and to define limits of supply; to break up streets and recover rents, to raise additional capital, and to acquire additional land and patent rights; incorporation of Acts; and other purposes.

WELLINGBOROUGH GAS.—Maintenance of existing gas-works; manufacture and storeage of gas and residual products; limits of supply; levying of rates and charges; regulation of capital; additional lands.

YSTRAD GAS AND WATER.—Power to raise additional capital.

Miscellaneous News.

IMPERIAL CONTINENTAL GAS ASSOCIATION.

The Half-Yearly Ordinary Meeting of this Association was held at the City Terminus Hotel, Cannon Street, London, on Tuesday, the 26th ult.—Sir JULIAN GOLDSMID, Bart., M.P., in the chair.

The SECRETARY (Mr. Albert F. Jackson) read the following report:—

The present half-yearly ordinary meeting of the Proprietors has been convened, agreeably to the Company's Act of Parliament, for the purpose of receiving a report from the President and Directors upon the affairs of the Association, and for declaring a dividend for the half year ended the 30th of June last.

Gas Made.—The total quantity of gas made at all the stations in the half year ended the 30th of June last was 2550 million cubic feet. The total quantity made in the corresponding half year of 1877 was 2470 millions, showing an increase of 80 millions, or at the rate of 3·24 per cent.

Lights.—The total number of lights at all the stations on the 30th of June last was 1,166,494. The total number on June 30, 1877, was 1,114,885. These figures give an increase of 51,609, or at the rate of 4·62 per cent.

Mains.—The total length of mains laid up to the 30th of June last was 1152 miles. The total length on June 30, 1877, was 1110 miles, being an increase of 42 miles.

The Board have now to inform the Proprietors that Mr. G. W. Drory, after an active service of 53 years, in June last requested the Directors to relieve him of his duties as General Superintendent on the Continent, on account of his inability, through increasing age, to perform them.

The President and Directors accepted Mr. Drory's resignation with regret, and at the same time recorded in an especial manner their appreciation of his eminent services.

They further resolved to ask him to continue to give to the Board the benefit of his ability and long experience by acting as the Consulting Manager of the Association. That position Mr. Drory readily accepted.

Mr. Wingfield, whose temporary appointment as Travelling Inspector to the Association had proved of very great service, was on the 20th of February last permanently appointed, and has continued to give unremitting attention to his duties.

The rental and the profit for the half year ended the 30th of June last were both somewhat augmented when compared with the figures for the corresponding half year of 1877.

The cost of the coal employed in the half year now under consideration was less than that of the coal used in the corresponding half year of 1877.

In the value of coke there was a diminution of 6·86 per cent., and in that of tar of nearly 10 per cent. A considerable increase, however, showed itself in the value of the ammoniacal liquor—viz., 41·18 per cent.

Considerable sums were expended during the half year in bringing up the purifying arrangements at Antwerp, Rotterdam, Hanover, and Vienna to the latest point of improvement.

The new works at Baumgarten, near Vienna, have been continued, and also the extensions of two at Währing and Belvedere.

At Lille a dwelling-house was erected for the Engineer.

A large expenditure was necessarily incurred for enlargement and extension of mains at the various stations, especially at Amsterdam, Berlin, Antwerp, Frankfort-on-the-Maine, Haarlem, and Vienna.

At Antwerp, Lille, and Vienna plots of land were purchased.

At Berlin a contract was concluded in May last for lighting the Rittergut property near Tempelhof.

At Brussels all differences with the Town Authorities have been satisfactorily settled, and they paid in June last the balance of the money due for the works they had purchased from the Association.

The Directors have now to inform the Proprietors that on the 27th of June last they purchased, for the sum of 3,740,100 frs. (£149,604), on behalf of the Association, 16 works in France, lighting the following towns:—Armentières, Les Andelys, Argenton, Cernay, Cholet, Estaires, Evreux, Meaux, Morez, Nonancourt, Quiévrain, Romilly-sur-Seine, St. Jean d'Angély, St. Yrieix, Thisy, and Uzès.

The Directors trust that when these works have been put in order, they may form a valuable portion of the system of the Association.

To supply the vacancy caused by the lamented decease of the late Sir Francis H. Goldsmid, Bart., M.P., the Directors elected Mr. George Simpson, an old and large Shareholder, to be a member of the Board.

The President and Directors desire, in conclusion, to draw the attention of the Proprietors to the accounts for the half year ended the 30th of June last.

These have been duly audited, and from them the Directors have, in accordance with the provisions of the Companies Clauses Consolidation Act, prepared a scheme showing the profit of the Association for the last half year, and the portion thereof applicable to the purposes of dividend which the President and Directors recommend now to be declared—namely, a dividend of 5 per cent. for the half year ended the 30th of June last, payable, free of income-tax, on and after the 14th day of December next.

The CHAIRMAN said: In moving the adoption of this report, there are various matters with regard to which I desire, on behalf of the Board, to say a few words. Sir Moses Montefiore, whom we should have been glad to see here, has expressed his regret that he is not able to be present, but he thinks we have reason to be satisfied with the results of the past half year. I also deeply regret that, owing to the loss of his sole surviving son, the Deputy-Chairman (Mr. Wood) is not able to be present. In the report there are many matters which intimately concern us all. The first to which I will refer is the general result of the half year's working. Considering the depression of trade, to which reference has been made at

the meetings of nearly all the Companies in England, and which has also largely existed on the Continent, I think it is by no means an unsatisfactory result to find at the end of the half year now under consideration—which is the worst half of the year—we have been able to make a somewhat increased profit, and to declare the same dividend as we did in the corresponding half of the previous year. I believe every attention has been paid to the management of our business by our able officers on the Continent, and the Directors have been constant in looking after all their different departments. The next point is Mr. Drory's resignation. Of course, it would be idle for me to say that, during the last few years, Mr. Drory has been able to pay that constant attention to the work of this Association that he did. In former years it was his business to go, from time to time, to every one of our stations, and personally inspect all, and superintend the proceedings of gas-making; but he has latterly become unable to do so, in consequence of his advancing age and infirmity. As far as intellect and management are concerned, he has been quite equal to giving the same attention that he did during the previous years of the history of the Association. Mr. Drory, however, with that conscientiousness, which I hope would actuate all of us, seeing that it was desirable that there should be more active inspection of the works from an engineering point of view, thought it right to resign, at least, that important part of his duty. The result is that we still retain the benefit of his experience and knowledge; but since the end of the half year to which this report refers, we have made other arrangements, by which we think we shall secure the most efficient engineering inspection, just in the same way as we secured last year, by the appointment of Mr. Wingfield, the most efficient inspection in the financial department. The gentleman who has taken the office of Inspecting Engineer is Mr. Leonard Drory, who has always rendered most excellent service to the Association; and I am quite sure that in his new capacity he will give the same satisfaction that he has hitherto done in the position he has filled. The next question is one to which a short reference is made in the report. We have bought a number of small works in France, and in order to explain the position of this matter to the Shareholders, I must go back somewhat, and remind you of the trouble we had some few years ago with regard to our station at Bordeaux. We were endeavouring to arrange with the Municipality of Bordeaux for a renewal of the concession, which was then about to expire; but the result was unsatisfactory. The concession for the lighting of Bordeaux was given to a person of the name of Gautier, who had a Company which had lighted a large number of small towns, and who was to build entirely new works. If this had been carried into effect, our works would have been totally useless, and we should have lost everything except the value of the land they stood upon. Under these circumstances, as Mr. Drory was not able to attend to the work, I undertook it, and the result was that the concession was quashed, and new arrangements made, by which it was stipulated that if the new concession should not be obtained by the Association, the value of our works and property should be paid by the person who took up the lighting. Consequently, when we found we could not compete for the lighting, we were still secure, as we obtained the money invested in the works. Some short time after that—Mr. Gautier, I believe, had been paying large dividends to his Shareholders—complaints arose, and the accounts were examined by the Procureur-Général, the result showing that the dividends for years past had been paid out of new issues of shares. The outcome, was the Company failed for 16,000,000 francs. The Syndic of the failure then managed these works for several years; but at last, this year, they were put up for sale, and we bought them for 3,740,000 francs—rather less than one-fourth of the nominal capital they represented. Of course, considering the circumstances and history of the Company, you can well understand that the works are not in good condition; but we have been accustomed to putting stations in order, and we believe that in the course of a few years we shall be able to make this a fairly contributing part of the property of the Association. We have, on previous occasions, repeatedly had offers of other stations; for instance, Moscow. It was known that the Moscow gas-works were a source of enormous loss to the previous proprietors, and therefore we did not accept that offer. However, there is nothing of that kind in this case, and I believe this will, as I have said, become a fairly remunerative portion of the property of the Association. We have not had to draw upon our reserve-fund for making this purchase. We have been able to effect it with the money paid to us from Bordeaux, and a portion of the Brussels works we sold. So much with regard to the report, which also gives the usual working details, and these I believe are satisfactory. You will probably like to hear something with regard to one of those amusements which the world, and especially the financial world, likes to indulge in from time to time—namely, a scare. It has been said in some papers, and I have heard it widely repeated by many people, that the electric light is like sun light. It appeared to be, however, very much more like what is ordinarily called "moonshine." I do not pretend to be a scientific man, and, though we are fortunate in having one or two scientific men upon the Board, I do not think that we are very scientific. At the same time, we have been endeavouring to obtain the best opinions we could, so as to be in a position to make you acquainted, as far as possible, with the exact position in which this matter now stands. What has, perhaps, most directed public attention to this question has been the system of lighting adopted for a short time in Paris. Everybody who has been over to see the Exhibition, has probably noticed the Avenue de l'Opéra, where the electric light is at present, but only for a few days longer, to be seen. Perhaps you are not aware what the conditions are under which the light has been established. The Municipality of Paris had a very hot discussion with regard to the question as to whether they should make any arrangements for allowing the Jablochkoff light to be tried in that or any street, and, as the result of the discussion, it was arranged that it should be tried up to the end of October, and, subsequently, the time was extended to the end of November. The terms of the agreement are these—that for every light the town has to pay the Jablochkoff Company 1 fr. 25 c. per burner per hour. Of course, those interested in the electric light have stated over and over again that the results of their lighting are something extraordinary; but where they have especially erred has been in the calculation of the quantity of gaslights which one of their lights would replace. I am told, upon the best engineering authority in Paris, that one of those lights represents about 12 gaslights. The price paid in Paris for each gaslight is about 2 centimes per burner per hour, or 24 centimes for 12 burners throughout. The Municipality are paying exactly five times the amount for the light which is furnished by the Jablochkoff candles that they might have done if it had been furnished by gas. They are very well aware of that, because they have declined to go on with the arrangement. It is not half so simple as the persons concerned in the electric light have endeavoured to persuade the public is the case. Four gas-engines are at work in lighting the Avenue de l'Opéra, with a fifth one in reserve; and, as far as the cost of the light is concerned, the promoters have declined to give any financial results. Therefore, up to the present time, the City of Paris are dissatisfied with the light because of the enormous expenditure it entails in comparison with gas. The best test of all is this: A short time ago, when the scare began, the shares of the Jablochkoff Company, which are 500 frs. nominal value, were selling eagerly at 1200 frs.; at the present moment you can buy them under par, and holders will be only too glad to get rid of them. What is the electric light? You cannot produce light, or anything else, except by the use of a certain force or power—that is to say, by a waste of power. The question with regard to gas lighting, as compared with electric lighting, really is, Where is the waste least, and how far do the circumstances of the one prove more advantageous than the circumstances of the other? In order to carry out a system of lighting by electricity, you must, in the first place, have an expensive machine, such as that of Gramme, and a gas-engine, steam engine, or other prime mover, or water power; and you must have your *locale*, for up to the present time nobody has succeeded in producing the light at a greater distance than 400 mètres from the engine itself, and even in that case it was only partially successful. The ordinary distance is 200 mètres. Under such circumstances it was very advantageous to try the experiment in the Avenue de l'Opéra, where there are a large number of unfinished houses, and the Company were able to put the machines into them at a moderate expense; but you can well understand that in the middle of a great city like Paris or London it would be almost impossible to get *locales* every 200 or 400 yards apart, which would, in any financial way whatever, make it suit the purposes of a town to expend such large sums of money as would be necessary to remunerate the proprietors of the electric light. Now, I think I have shown you, as far as public lighting is concerned, that at present the cost of the electric light is about five times that of gas, and this is only for the public lighting, which no Gas Company have ever declared to be the best part of their business. In fact, there are many towns on the Continent where the public lighting does not produce us anything—where it is the private consumption alone that brings in the revenue; and, consequently, if the public lighting were taken over by an Electric Light Company, I do not think it would injure us, or any other Gas Company, considerably. There is a system which has been strongly advocated in part of the public Press—the Rapieff system; but I asked some of the promoters of the Company started to work that system, whether they would give me a financial statement to prove how far it would be to the advantage of the public, or anybody else, to supersede gas light by their system of electric light; and my friends declined to comply with my request. It appears to me that as long as these things cannot be submitted to the investigation of competent persons, and no reliable figures can be given, there is not much reason to fear that any serious competition will be carried on with Gas Companies. The result of my observations is that, as far as we can see, there is really no reason whatever to be alarmed with regard to the future of this or any other Gas Company. Electric lighting may be used in places where the question of cost is not considered; just in the same way as many of us use, by preference, a large number of Carcel lamps or good candles, because for some reason or other we choose not to have gas in our drawing-rooms, although, at the same time, we use gas all through the offices, and for many domestic purposes. One of the greatest electricians of the present day, discussing the question with me with regard to the supersession of gas lighting, said: "It is simply absurd to talk about gas lighting being superseded. For some purposes for which gas is now used, the electric light may be employed; but probably the only result will be that more gas will be consumed, and that will be a great advantage to the Shareholders in Gas Companies." The gentleman who made that statement was Dr. Siemens—one of the first, if not the very first electrician of the day in England. We have heard a great deal about Mr. Edison; but the American Gas Engineers are not afraid of that gentleman, or any of his inventions. I believe those who know more of these things than I do, say that when the vast sources of petroleum which exist in America were first discovered, the panic with regard to the probable result upon the holders of gas shares was much greater than anything which has occurred, even in England, with regard to the present scare; but the result has been that petroleum is very largely used indeed, and gas still more largely. Perhaps you would like to know why it does not appear to be so easy that gas should be superseded for very many purposes. The first reason is that, as I pointed out to you, the light is produced by the waste of some force or power. Gas is produced by a certain amount of waste of coal; but you must remember that the gas is only one of the products of coal. You have residuals, and you have, therefore, a very large return upon your expenditure from this lighting material, in consequence of your secondary products. But you have nothing of that sort in the electric light; the whole expenditure is upon the lighting, and in many cases I am told that the same amount of light could have been produced by the gas which was burned in the gas-engine which produced the electric light; consequently, in those cases, even if the cost were the same, you can see the utter extravagance of the proceeding. Another great advantage of gas is that you can store it. For instance, something gets out of order in a portion of your gas apparatus, and you have other portions which come into use immediately. You have beds of retorts; one is thrown out of work, and you have perhaps 8, 15, or 20 others which are just as good, and do the work quite as well without the one that has failed as with it. But if the engine which furnishes the electric light breaks down—as occurred the other night at Billingsgate—it becomes a serious matter, and involves the duplication of much of the plant. Another advantage is, that you have much greater control over single lights under a system of gas lighting. If you do not want to use more than one light, you need not do so; at the same time, you may use a hundred without affecting the question of the burning of that one. No doubt, however, a large portion of the public look upon gas and water proprietors as their natural enemies. You hear over and over again some strong protest with regard to the burning of the gas in some private individual's house, and when you come to investigate it you find, perhaps, that he has been going on the system of endeavouring to light St. James's Hall by means of a farthing candle. Of course, you must proportion the expenditure of the element you want to the use to which you mean to put it, and if persons would only employ a little more scientific knowledge in the use of their gas, and the method of burning it, I believe they would get a great many advantages which they have not now; and we should hear very little indeed of those complaints with regard to the conduct of Gas Companies, which are not the result of any fault on the part of the Gas Companies, but are caused by the consumers themselves; consequently, I think what I have said will show you there may be an unscientific use of gas, just as there may be "unscientific frontiers" in various parts of the world. It does not at all follow that improvements may not be made. We are told they may be made in frontiers, and so they may in the consumption and use of gas; but, as regards gas being superseded, we do not believe that this will take place; and if the electric light should hereafter turn out to be useful in lighting large public places or very extensive factories, where the question of cost will not be considered, it will, if anything, tend to promote the consumption of gas rather than to hinder it. You will understand, therefore, that the Board do not sympathize very warmly with the extraordinary panic which has prevailed among gas shareholders. We do not say no improvements will ever be made which will make electric lighting possible. All we say

is, we do not believe it will supersede the use of gas. The new light may be substituted for gas in some cases; but the only result will be that other applications of gas will be found, and there is every reason to believe that Gas Companies will in the future be as prosperous as in the past. Still, it is always well to be in a position to meet every sort of difficulty, and it was pointed out to us that although we have contracts by which, in some cases, we are bound to introduce, and in other cases we have the option of introducing improved methods of lighting, it is not perfectly clear, under the reading of our Act of Parliament, whether some English legal difficulty might not arise, because it is said we are a Company created for the purpose of producing and selling gas. Therefore, we propose to go to Parliament for a short Bill, authorizing us to use other means of artificial lighting already known or hereafter to be discovered. I do not think much of that myself, because I believe there is nothing already known which is likely to supersede gas, and therefore the value of the Act will be in the "hereafter to be discovered." Another matter to which I wish to refer is a personal one to the Board at large, and especially to myself. As long as I have held my present position I have endeavoured to do my best for the good of the Association and I think a certain amount of charity ought to be exercised towards us with regard to our acts. Consequently, I think one or two Shareholders have gone beyond what we consider to be the right limits of their duty in writing to me to point out that we were responsible—that I and the other Directors were, but especially I was responsible—for the fall in the price of shares, and for the loss which had resulted to the Shareholders, because I had not contradicted, or confirmed, a paragraph sent to me from a newspaper, and some other paragraphs to which reference was made, but which were not sent. Now, I submit whether it is reasonable for a Board of Directors, in the first place, to begin to concern themselves with newspaper paragraphs. As one who has had some experience in Parliamentary elections, I must say I never consider it is advisable to take notice of newspaper paragraphs, for the very simple reason that the Editor of the paper always has the last word; and if the Board were to begin to answer paragraphs in the newspapers, I do not know where it would end. I wrote to one gentleman in reply to his letter, and received another reply from him, stating that my answers were "totally unsatisfactory," and that I and the Directors were "responsible for the serious loss which had accrued to the Shareholders." I looked to see what the loss was this gentleman had suffered, and, to my intense astonishment, I found that if he had sold at to-day's market price, he would have made at least 15 per cent. profit upon his holding; and, besides, his holding was so small—namely, £200 stock—that it could not make any difference to him whether he sold at the top price or not. But I also thought if we were to be held responsible for a fall in shares, ought not we to get the credit of a rise? Last year there was a very considerable rise; but neither that Shareholder nor anybody else wrote to thank me for it. I think it is not right to say that we are responsible in this way. We are responsible for doing our best to manage the business of the Association, and we have not anything at all to do with accidental circumstances and the market price of shares. The moment that Directors begin to concern themselves with this sort of thing, from that moment you may date the downfall of many Companies. You get Directors dabbling in shares for themselves, and then you have Directors dabbling in shares on behalf of the Company, and that is a thing which this Board would repudiate in every possible way. I thought it right to make these observations, because when I received the second letter, I sat down and wrote the angriest reply that I ever penned in my life. After I had written it, I did not send it; and perhaps it was a good thing that I did not; but I thought that in return I would say something at the public meeting of the Association. I have now said it, and I thank you for the sympathy which you have shown towards me. With these observations, I beg to move the adoption of the report.

Mr. Vyvyan seconded the motion.

Mr. Porter said they were very much indebted to the Chairman for the ample and lucid statement he had made. With reference to the unscientific use of gas on the part of consumers, he thought they ought to try first to ventilate their rooms, and then to obtain the best burners, so that the gas might be thoroughly consumed. Gas Companies should do the best they could to improve the quality of their gas, and they might also do great service to the public by helping those people who are not scientific. The Chairman had said that he and others often did not use gas in their drawing-rooms; but he (Mr. Porter) believed that if they had proper burners the gas would not be unpleasant. Gas Companies might do a great deal to promote the consumption of gas, and make it much more popular, if they would inform people what were the best burners to use.

The Chairman, in reply to several questions, said there had been a fall in the price of Paris gas shares from 1500 frs. to 1200 frs. per 500 frs. share. The price of those and other gas shares had been driven up about a year ago, and they had suffered to a certain extent from the general fall that there had been in all securities, however good. In reply to a suggestion that the Association should undertake some experiments with the electric light, he said experiments of the most costly description were being made every day in electric lighting, and people were losing money by them. Why the Association should add themselves to the list, he did not understand. It might be useful to assist some of those persons by enabling them to save their money. He did not wish to enable them to save their money; on the contrary, it was much better that they should be allowed to buy their own experience, and then the Gas Companies could obtain all the information which might be useful as the result of that expenditure. As to burners, they all knew that Mr. Sugg had a great variety of excellent gas-burners, and many other people could supply very good ones.

The motion for the adoption of the report was then put and agreed to.

On the motion of the Chairman, a dividend of 5 per cent. on the £2,800,000 stock of the Association, free of income-tax, was declared for the half year ending June 30.

A special vote of thanks to Mr. G. W. Drory, and to the Officers of the Association was adopted; and the Directors received a similar compliment.

BAHIA GAS COMPANY.

The Ordinary Half-Yearly General Meeting of this Company was held at the London Offices, on Tuesday, the 26th ult.—Edward Horner, Esq., in the chair.

The Secretary (Mr. A. J. Head) read the notice convening the meeting, and the following report and accounts were presented:—

The Directors herewith present the audited statement of accounts for the half year ended June 30, 1878.

The gentleman sent out by the Board to investigate the affairs of the Company in connection with the recent defalcation, has made his report, and the amount of the defalcation is within the estimate given in the last report of the Directors.

The Board ordered that the defaulting clerk should be prosecuted, but the delinquent absconded. The Court, however, passed sentence on him in default.

The Board of Customs at Bahia has for some time past levied duties on the materials imported by the Company, in contravention of the exemption accorded by the Concession, and by a Special Act of the Brazilian Legislature. These duties on iron goods are so heavy that the Directors have determined to suspend the further shipment of mains, pending the result of the appeal which they made in July last to the Imperial Government through His Excellency Baron de Penedo, the Brazilian Ambassador to this country. They have also despatched an agent to Rio to support their application personally, and the Directors rely on the equitable consideration of the Brazilian Government to sustain the validity of their own Acts, and to satisfy the legitimate expectations founded on them.

A further sum of £400 has been carried to defalcation suspense account, reducing the profit for the half year to £3176 1s. 6d., which, with the balance brought forward, makes the sum of £3394 16s. 11d. The Directors recommend the payment of the preference dividends of 10 and 7½ per cent. respectively for the half year, and that a dividend of 3 per cent. per annum be paid on the ordinary shares. This will require £3625, to meet which £500 has been taken from the reserve-fund. There will then be £269 16s. 11d. to carry forward. The dividend warrants will be sent out on the 3rd of December.

The Directors retiring by rotation are Mr. Arthur Clarke and Mr. Henry Finlay. The Auditor retiring is Mr. Magnus Ohren. They offer themselves for re-election.

Balance-Sheet, June 30, 1878.

Dr.				Cr.			
Capital—				Concession		£7,000	0 0
5000 ordinary shares	£100,000	0	0	Investment to Dec. 31, 1877		101,385	18 0
1000 10 per ct. preference shares	20,000	0	0	Additional during half year		843	16 2
1500 7½ ditto ditto	30,000	0	0	Freehold land, June 30, 1878.		5,033	12 7
Debentures	2,450	0	0	Meters fixed		2,737	18 5
Creditors—				Office furniture and fixtures.		351	12 6
On open accounts	1,839	2	6	Preliminary expenses		16,914	17 3
On acceptances	8,849	0	3	Suspense account—			
Dividends unpaid	331	13	2	Extension of retort-house, &c.	114	12	10
Debenture interest	62	17	1	Mains renewal	2,946	0	5
Insurance-fund	47	4	10	Plant	388	9	10
Reserve-fund	2,500	0	0	Amounts due for gas, fittings, &c.—			
Profit and loss	3,894	16	11	Public lamps	3,177	4	1
				Ditto establishments	3,987	11	3
				Private rental, fittings, &c.	6,040	7	7
				Sundry debtors	2,157	18	10
				Stock—			
				Coals	7,237	12	1
				Coke	93	7	6
				Fittings	3,202	18	9
				Sundries	3,256	18	11
				Goods in transit	1,673	17	5
				Cash at bankers—			
				General account	1,046	19	8
				Dividend account	394	10	3
				London office	8	10	5
	£169,974	14	9		£169,974	14	9

Revenue Account, for the Half Year ending June 30, 1878.

Coals carbonized	£5,727	16	3	Gas supplied to public lamps	£9,608	13	0
Purifying materials and wages	174	19	8	Less fines	202	17	8
Carbonizing wages	1,131	14	5		£9,405	15	4
Wages, yardmen, &c.	273	9	11	Private consumers	6,057	17	7
Repairs, mains, and services	708	12	7	Public establishments	1,321	4	8
Lighting and repairing lamps	1,609	6	11	Meter-rental	531	2	11
Salaries	1,712	8	9	Products £1,843 13 4			
Directors fees	400	0	0	Less labour 84 0 9			
Auditors fees	21	0	0		1,759	12	7
Rent and taxes	151	4	4	Transfer fees	1	2	6
Interest	127	4	10	Profit on fittings	135	19	5
Stationery	89	11	7	Bad debts recovered	4	17	2
Office expenses	36	18	11				
Trade charges	298	15	7				
Travelling expenses	29	11	0				
Wear and tear	997	1	9				
Bad debts and allowances	410	1	1				
Exchange	445	15	11				
Law charges	73	5	1				
Extraordinary disbursements—							
Extension of retort-house—							
One-sixth of £1274 16s. 3d. (last instalment)	212	9	5				
One-sixth of £687 17s. 5d. (5th instalment)	114	12	11				
Renewal of mains—							
One-sixth of £585 16s. 5d. (4th instalment)	97	12	8				
One-sixth of £3424 19s. 0d. (2nd instalment)	570	16	6				
One-sixth of £560 18s. 5d. (1st instalment)	93	9	9				
Renewal of plant—							
One-sixth of £739 9s. 4d. (4th instalment)	123	4	10				
Defalcation suspense account	400	0	0				
Balance—profit	3,176	1	6				
	£19,217	6	2		£19,217	6	2

Profit and Loss Account.

Dividend declared May 23, 1878	£3,625	0	0	Balance of account to Dec. 31, 1877	£3,907	19	2
Interest on debentures to the 30th of June	64	3	9	Revenue account, net profit for the half year ending June 30, 1878	3,176	1	6
Balance	3,894	16	11	Reserve-fund	500	0	0
	£7,584	0	8		£7,584	0	8
				Balance	£3,894	16	11

The Chairman, in moving the adoption of the report, said: In presenting this account to you, I do not think the figures vary very greatly from those which we have had before. There are some items which, of course, affect the account. In regard to the matter of carbonization, the revenue is somewhat less than it was; but that has been effected by a very large saving in coals. We have carbonized 425 tons of coal less than in the previous half year. They have not been purchased at so low a price as the others; but the freights have been high, and this would naturally affect the account. If that had not been the case it would have made a great difference in favour of the Company. Considerable economy has been exercised. The repairs have cost less by £250; and the wear and tear something like £300 less. The items which otherwise seem to affect us, but over which we have no control, are those relating to the exchange, which has cost £226 more than in the previous half year—the amount being upwards of £400 for the half year. Altogether the manufacture has certainly been very much improved. The rental per ton is £5 12s. 9d., against £5 5s. 5d. in the previous half year. The residual products realized 11s. 10d., against 9s. 9d., and the amount of fuel used has been 4 per cent. less. The Company have expended considerable sums in sending out pipes, and these we believe are now beginning to realize our anticipations. They had not come into operation in the half year for which the accounts are before us; but though only partially applied at the present time, we have succeeded in saving some 15 per cent. in the leakage already. I do not know what the total result will be when the system is completed all over the town, but it will materially diminish the leakage; and when we come to lose 25 or 30 per cent. of the gas made—gas of such value as it is there—it is a very serious thing. The great difficulty with which we have now to contend is the conduct of the Brazilian Government. That Government, under their concessions, have not hitherto charged duties upon our plant and machinery; but they have now levied very heavy duties upon us. The duty which they now make us

pay amounts to 140 or 150 per cent. upon the cost of the pipes. That, of course, most seriously affects the capital employed, and necessarily leads to a great deal of embarrassment. In July, therefore, we memorialized the Government on the subject, and our representative is now there, endeavouring, as much as lies in his power, to induce the Government to remit these duties, which they have so improperly charged. Now, to show you the want of faith with which the Brazilian Government are acting, they have passed a law, of which clause 3 is as follows:—"The Government are empowered to subject to the custom-house charge (*expediente*) of 5 per cent. the articles imported, duty free, by the companies, undertakings, or individuals to whom has been conceded exemption from that contribution, and whose profits shall be over 6 per cent. and under 10 per cent. on the capital employed, and to raise the said tax to 10 per cent. when such profits also exceed 10 per cent., there not being, in either case, solemn contracts of a reciprocal character which may render necessary previous agreement between the Government and the concessionaires." In clause 4 they say: "The fixed periods shall terminate within which the concession of exemptions from customs duties granted to companies at present enjoying this favour, or which in future shall enjoy the same, having regard to the state of such companies." They induced us to go out there to light the town on certain terms, and they said that they would relieve us from paying those duties; and now they pass a law to terminate the exemption. If ever there was an example of breach of faith on the part of any Government in the world, it is to be found in the dishonourable conduct of the Brazilian Government. They have induced us to lay out your capital on certain conditions, and have taken the law into their own hands to set aside those conditions. I do not know how we can do justice to ourselves except by stating these things in an assembly of this kind. It will thereby get into the Press, and, I hope, reach the other side of the water. The gentleman we sent out there is still using his best endeavours to get a remission and a return of those duties; but he has not yet progressed sufficiently to be able to say whether he will be successful or not. We hope, however, that he will succeed in getting returned to us what is just and right. You will perceive that the profit of the half-year is somewhat less than it has been. That is mainly accounted for by some £400 which has been written off for defalcations. The leakage account is not, at present, as low as we hope to get it; but it will be a grand thing if we can get it down to 10 or 12 per cent., instead of its standing at between 30 and 35. You will naturally expect that I shall make some allusion to the staff. It is rather a delicate question, because, as yet, we have not come to any definite conclusion as to what we shall do. The defaulter has been prosecuted, and been found guilty; but, unfortunately, he absconded, and got away to the States; so that, although we have the judgment against him, we have been unable to put it in force. We have done everything which we could do to obtain justice in this matter. We have also been obliged to remove another person from the establishment, because, possibly, he knew so much about it that we thought he should not continue in our service. This, of course, has left us very short of officials out there. Consequently, it is quite impossible to make a change now; and it would, perhaps, be better for us not to reveal what we intend to do in the matter. One thing I will say for the present Manager, and that is, that what he thought could be done by a re-arrangement of pipes is certainly coming to pass; and perhaps it would have been a little hard to send him adrift just now, considering that he was the proposer and cause of the re-arrangement. You will agree with me that it is rather a delicate question with respect to our Manager. I cannot, in public, say what we propose doing. We must, as Directors, ask you to give us in this matter that confidence which I am sure you have all reposed in us hitherto. I beg to move the adoption of the report.

The motion having been seconded,

Mr. H. H. MAUDE said that, considering so much English capital was embarked in the Brazils, he thought some joint action should be taken, and representations made to the Brazilian Government through the Foreign Secretary. Lord Salisbury had had a great deal of experience with public companies, and they could not have a better man to take up a question of this kind. The very fact of making the matter public would affect the price of Brazilian Securities in the market, and would bring the Brazilian Government to their senses.

The CHAIRMAN explained that almost all the Companies trading in Brazil had been communicated with, for the purpose of enabling some joint action to be taken; but some of them, from certain causes, did not seem willing to move in the matter, although he believed the Rio de Janeiro Gas Company had done so.

Mr. MAUDE: What are the Railway Companies doing? The duty on rails must be a very important matter there.

The CHAIRMAN said that the Directors were doing all they possibly could to bring all the influence of the other Companies to bear on the question.

Mr. MAUDE thought that the movement should originate in the City of London, and not in Brazil. A representation from Lord Salisbury to the Brazilian Government would have more effect than anything else.

The CHAIRMAN said he was much obliged to Mr. Maude for his suggestion; but at present he thought it would be prudent not to take further steps in the matter. Some years ago he was a Director of the Ottoman Gas Company, and when the Turkish Government did not conduct themselves properly, Lord Derby gave the Company his assistance.

Mr. MAUDE said that some ten days ago he received a prospectus of some new Brazilian railway—some new line to Pernambuco; but if the proceedings of the Brazilian Government with regard to the Bahia Gas Company became known, nobody would take shares. He hoped that the matter would be made as public as possible through the agency of the Press.

Mr. ALFRED PENNY asked whether there had been any reduction in the price of gas since the last meeting.

The CHAIRMAN said that there had not.

Mr. PENNY said that he asked the question because the gas-rental appeared to be between £300 and £400 less this half year than the previous one. The general experience was, that the consumption of gas was ever progressive, and he was certainly surprised to find it decreasing in the case of this Company. The exact decrease for the present half year was £360.

The CHAIRMAN said that if Mr. Penny referred to the accounts for the corresponding half year he would find it was rather more than that.

Mr. PENNY said this was the first meeting of Shareholders in this Company he had attended; as, after reading the report of the last half-yearly meeting, he had purchased shares in the undertaking, because he thought the concern must improve, the report to that meeting showing losses which probably would not occur again. He referred more particularly to the robbery of £2000, and the enormous loss of gas by leakage, &c., which was stated to be upward of 30 per cent. of the make. He did not, as a single Shareholder, pretend to do more than suggest for the consideration of the Directors whether it would not be advisable to reduce the price of gas to private consumers, the price charged being a high one, and the consumption absolutely decreasing instead of increasing. But as this was a matter peculiarly in the province of the Directors, he would content himself with bringing it under their notice. With regard to the sum of £2000, which appeared in the balance-sheet as the "Defalcation and Suspense Account," his view of the matter was that it would have been advisable at once to write off the whole sum from the reserve-fund. The money had gone and would never come back, and it would be better that the Shareholders should not hear of it again. As regards the leakage, he looked upon that as the bright spot in the Company's affairs, simply because it was a preventible loss. If the leakage was reduced, say, to 10 per cent., the increase of the Company's profits would be very considerable; it would really mean a saving in the cost of one-fifth of the quantity of coals carbonized, and a corresponding reduction in the expenditure on wages and plant now used to produce the large quantity of gas which was absolutely wasted. It was well known that the London Companies had reduced their leakage to about 6 per cent. of their make, and it must be peculiarly annoying to those gentlemen who had the conduct of the affairs of the Bahia Gas Company, and who are also eminent in the gas world, to know that such losses should be sustained by the Company. He had no doubt from the observations on this subject made by the Chairman, at the last half-yearly meeting, that the Directors were fully alive to its importance; but he hardly expected to see any results in the present half-yearly accounts. He hoped, however, with the Chairman, that in succeeding half years the benefit of what they were now doing would be felt—that the 30 per cent. of leakage would disappear, and that something like a normal loss of 10 per cent. only would be the result. He was sure that the Directors had done the best they could for the Shareholders, and he hoped at the next meeting there would be a better tale to tell.

The CHAIRMAN said that the Directors could not reduce the price to the private consumers without reducing it for the public lights, and as the revenue from the latter was the backbone of the concern, it would be impolitic for them to do so. Then the Company charged less for their gas than any other Company in Brazil. With regard to the falling off of the rental, it would be found, comparing the corresponding half year, that it was rather more; but against that it must be stated that 425 tons less of coal had been used; therefore, it was not all loss. No doubt the leakage question was a very important one. It was impossible to avoid leakage. He was told that Bahia was an exceedingly difficult town to light, being very hilly, and it had been impossible to check the amount of gas consumed by the public lamps, owing to the insufficiency of the mains. Large pipes had now been provided, and he hoped all defects would be remedied. With regard to the defalcation account, the Directors felt they could not sweep it away, inasmuch as they hoped some of the money would be returned, although it might not be a large amount. After receiving all they could, the Directors would then consider the advisability of writing off the balance.

The motion was put and carried unanimously.

The usual motion for the declaration of the half-yearly dividend was then proposed by the CHAIRMAN, seconded by Mr. STEPHENSON CLARKE, and carried.

The retiring Directors and Auditor were re-elected, and on the motion of Mr. MAUDE, a vote of thanks was heartily accorded to the Chairman.

The proceedings then terminated.

ORIENTAL GAS COMPANY, LIMITED.

The Ordinary General Meeting of the Shareholders of this Company was held at the Terminus Hotel, Cannon Street, London, on Thursday, the 28th ult.—JAMES SYDNEY STOPFORD, Esq., in the chair.

The SECRETARY (Mr. A. Hersee) having read the notice convening the meeting, the following report and accounts were taken as read:—

A statement of accounts for the twelve months ended on the 30th of June last is herewith submitted, and the Directors have pleasure in reporting that the steady progress of the Company has been maintained.

The number of additional public lights erected is satisfactory, comprising 36 in the town of Calcutta, 63 in the suburbs, and 12 in Fort William, or a total of 111 lamps.

The increased private consumption of gas during the year is also very encouraging. There has been an accession of 118 new consumers and 2025 burners, compared with 99 new consumers and 1890 burners obtained in the previous year.

Since last report the new gasholder has been successfully completed and brought into use. It is of unsual strength and solidity, and its construction has been so carefully carried out, that from the first it has worked in every respect satisfactorily. Ample storeage for the increasing make of gas has now been provided.

About three miles of additional mains have bren laid. The Company has been put to great expense in relaying a large number of cast-iron pipes, disturbed by the drainage works of the Corporation.

The buildings and machinery are reported to be in excellent order, but the provision of further purifying and condensing apparatus has become indispensable.

Long continued depreciation in the value of silver has occasioned a corresponding depression in the rate of Indian exchange and the profits of the Company are thereby seriously affected. With a revival of trade it is hoped some improvement may be witnessed.

The Shareholders are already informed that new contracts with the Authorities for street lighting in the town and suburbs of Calcutta, extending the present agreements for a period of 21 years—*i. e.* until the year 1901—have been entered into. In consideration of this extension of exclusive privileges, with an order for 1350 additional street lamps (namely, 1084 in Calcutta and 266 in the suburbs), the Company have been induced to incur heavy outlay and to make a considerable reduction in the price charged for the public lamps, and also to submit to several stringent conditions. It is, however, hoped and believed that the new arrangements will work to the advantage of all parties.

No change has occurred in the constitution of the Resident Committee, and the local interests of the Company are still confided to the care of Messrs. E. Broughton, R. C. Noble, and H. W. I. Wood.

It affords the Directors much pleasure to record their continued appreciation of the valuable services rendered generally by the Engineer and Manager, Mr. Blackburn.

The general revenue account shows a balance (after crediting a sum of £2000 to reserve-fund) of £16,982 4s. 6d., out of which the Directors recommend a dividend of 5 per cent., free of income tax, payable on the 4th proximo, making, with the interim payment of 4 per cent. on the 4th of June last, a total of 9 per cent. for the year.

The retiring Directors are Henry M'Lauchlan Backler, and John Robinson Peill, Esquires; the Auditors, Henry Lawrence Hammack, and Thomas Newton Stokes, Esquires, also retire. All are eligible for re-election and offer themselves accordingly.

Balance-Sheet, June 30, 1878.

Dr.			*Cr.*		
30,000 shares of £5 each	£150,000	0 0	Amount of plant on the 30th of June, 1877	£293,772	2 6
30,000 „ „ (60s. paid)	90,000	0 0	Outlay during the past 12 months	6,166	17 5
	£240,000	0 0	Cost of plant to the 30th of June, 1878	£299,938	19 11
Loans on debentures	76,770	0 0	Services laid and meters in use	8,388	17 6
Reserve-fund	13,681	0 0	Amount due to the Company	6,446	12 4
Unclaimed dividends	513	16 0	Value of stocks, viz.—		
Amount due by the Company	13,606	12 11	Coals	4,004	17 9
Balance from general revenue account	16,982	4 6	Purifying material	305	18 2
			Products	169	13 9
			Fittings and meters	5,591	13 2
			Pipes	2,463	2 5
			Horses, conveyances, &c.	438	0 0
			Sundry stores	7,250	11 5
			Office furniture, &c.	345	3 6
			Cash in Calcutta	24,647	15 10
			Cash in London	1,562	7 8
	£361,553	13 5		£361,553	13 5

Profit and Loss, or Working Account, for the Twelve Months ending June 30, 1878.

Manufacture & distribution—				Gas-rental	£50,294	10 9
Coals used, purification, and wages	£20,369	10 3		Coke, tar, fittings, &c.	14,250	18 7
Salaries in India & London	2,918	5 7		Transfer fees	19	3 6
Directors and Auditors	913	0 0				
Passage & general expenses	806	14 4				
Exchange	4,707	19 0				
Reserve-fund	2,000	0 0				
Mains account	2,036	17 7				
Wear and tear and repairs	2,328	18 0				
Retort account	1,086	14 8				
Bad debts and allowances	121	15 8				
Balance	27,274	17 9				
	£64,564	12 10			£64,564	12 10

General Revenue Account.

Dividend of 5 per cent., balance of 9 per cent. for the twelve months ending June 30, 1877, declared at the general meeting, Nov., 1877	£12,000	0 0		Balance on June 30, 1877	£15,298	6 4
Interim dividend of 4 per cent., on account of year ending June 30, 1878, paid June 4.	9,600	0 0		Ditto on profit and loss account	27,274	17 9
Interest on debentures	3,651	13 4				
Income-tax	339	6 3				
Balance	16,982	4 6				
	£42,573	4 1			£42,573	4 1

The Chairman, in moving the adoption of the report and accounts, said: Gentlemen, In the first place, I am happy to be able again to congratulate you on the generally favourable condition of the affairs of the Company. We have made very good progress during the past year, both in public and private lighting. The accession of new customers is greater than was the case in the previous year, and the net rental is just 5 per cent. more. Considering the reduction we have made in the price of gas, I think that is a satisfactory state of things. There is a very good prospect, I think, of increased business and increased profit during the current financial year. The price of our gas is a very reasonable one indeed; it is very nearly as low as in some of the Continental towns. For instance, in Paris they pay 8s. per 1000 feet, and our charge, taking the exchange at 1s. 8d. per rupee, is only 8s.; so that I think we treat our Calcutta friends very liberally indeed. The quality is also exceedingly good, and we are continually hearing of fresh customers. We experience a good demand for our residual products, tar and coke, at fair prices, and we never have any stock in hand. The Bazaar lights again show an increase, and we do not hear of any bad debts. Our receipts are about £65,000 a year, and our bad debts and allowances only amount to £120—a very small sum indeed. The new gasholder, referred to at last meeting, has been very successfully completed. It has taken more time and money than the estimate, owing to the great weight of the ironwork; but it was thought necessary to provide extra weight and strength to guard against the possibility of damage by the cyclones which visit Calcutta occasionally, and, in fact, now regularly occur. We have, at the present time, I am glad to say, the strongest and best gasholder in India. Our old gasholder is undergoing some necessary and rather extensive repairs. It has been a long time in use, and now that we have a good one, we thought it the right time to put the old one in order. When these repairs are finished, we shall be at ease as regards the storeage of gas, even with the expected great extension of our lighting. The new mains alluded to in the report were laid to supply gas to the lamps, also referred to in the report. The damage to our pipes, I am sorry to say, is still bothering us very much. It will have to be endured for some time yet, because the completion of the drainage will occupy two or three years. The evil, you know, is due to the nature of the alluvial soil of Calcutta, and it should entitle the Company to great consideration at the hands of the Municipality; but that consideration, I think, we have hardly yet met with. Our persevering efforts to decrease the leakage have been somewhat rewarded, as it is now some 2,500,000 feet less than it was the previous year, and our average leakage for the whole year is 22 per cent. against 24½ per cent., showing a balance of 2½ per cent. on the right side. Our works are kept in a good state of efficiency, and no expense is spared to conduct them on the best and most scientific principles. The exchange is the next thing I have to speak about, and that is indeed a very serious matter. It militates very considerably against the profits of the Company; at the same time, the Directors have no control over it. The same causes are in existence that were in operation last year, only perhaps in a worse degree. The depreciation of silver, caused by the excess of supply over demand, and the stagnation of trade, as shown by the great increase of the imports over exports, have had a very depressing effect. Recent events in the Indian trade, it is thought, will rather improve the exports, and we look forward to other causes which will, perhaps, ameliorate the condition of the silver market. The Afghan War will increase the circulation considerably, and the expected return to specie payment in the United States will also stimulate the demand for silver bullion. We fear that for some time we shall have to submit to great loss in our remittances. The item of £4700, which appears in the profit and loss account, represents the difference of exchange betwixt 1s. 9s. and 2s.—2s. being the rate at which we calculate a rupee, for the convenience of the sum; but, as I have said, the loss is £4700 on exchange of remittances of £33,000, at an average of 1s. 9d. per rupee. I am sorry to say the rate is now lower again, and it is impossible to form any idea as to what it will be. We hope it will advance to something near 1s. 9d. or 1s. 10d., but we cannot exactly see our way to it at present. I now come to a very important part of our report—namely, the new contract which, as we have already informed you by circular, has been entered into. It extends our concession for rather over 21 years. The present contract would have expired on Jan. 1, 1880, and the new one extends to 1901. The Directors took early steps for the renewal of the contract, but the negotiations were protracted and very difficult, extending over a period of more than eighteen months. The Municipality naturally endeavoured to obtain a good bargain for the town, and certainly I must say they have succeeded in doing so. Many unacceptable conditions were proposed and rejected. The Company were always ready to make reasonable concessions, but could not go beyond certain limits. In the end, the Company agreed to a settlement, which, as the annual report states, it is hoped and believed will work to the advantage of all parties. The primary effect to the Company will be a loss, the new outlay not being met by profit on the additional lamps; but the private lighting will gradually turn that loss into a balance on the right side. In making this contract, the great endeavour of the Directors has been to secure a long terms, even should it involve a temporary diminution of dividend; but I am very glad to say that we do not think it likely we shall have that diminution. We felt assured that such a result would be more satisfactory to the Shareholders than an uncertain arrangement on slightly better terms, which might be liable to be determined at a short notice. A 21 years contract was made the basis of our negotiations, as justifying a large outlay of pipes and additional plant. It is satisfactory to know that the Municipality admitted the reasonableness of this requirement, and granted it. It is not necessary to explain here the various clauses of the contract; but any Shareholder who wishes to see them, may get all the information he desires by calling on our Secretary. The main points may be thus briefly epitomized—The 2707 existing lamps are to be paid for until May, 1880, at the present rate of 72 rupees, and under present conditions. Additional lamps, erected and lighted in advance, are to be paid for till May, 1880, at 48 rupees each. After May, 1880, the whole 3791 lamps are to be charged at an aggregate annual sum of 220,000 rupees, or 58 rupees each lamp. The Municipality may increase the total number by 500, at 48 rupees each. This they will most likely do. The illuminating power of the gas is raised from 12 to 14 candles, with fines for deficiency. The maximum of impurities is prescribed, and penalties are fixed for excess. We have exemption from municipal taxes, there are no compulsory terms of purchase, and there is no other mode of lighting excepting gas mentioned in the coutract, and no provision is made for any change. It will be seen that the Municipality are great gainers. They get 16 per cent. more light—the difference between 12 and 14 candles—at about 20 per cent. less cost—the difference between 58 and 72 rupees. The Company, on the other hand, sacrifice considerable profit, and submit to conditions requiring increased outlay, to ensure a complete supply of gas in accordance with the new conditions. The Directors, however, have been careful not to commit the Company to an impossibility, and have every confidence in their ability, under ordinary circumstances, to comply with all the stipulations. The negotiations for the new contracts fortunately occurred at a time of depression in the iron trade, and we have been able to secure all the materials at very low prices. Had it not been so, we should scarcely have been able to meet the views of the Municipality. The suburban contract has also been completed. It differs slightly from the town contract. The extra number of lamps required by the latter is 266. That contract expires on Jan. 1, 1901—about four months before the contract with the Calcutta Municipality. The price per lamp is 60 rupees instead of 58, owing to the limited private lighting, and the quality of gas is 13 candles; but as all consumers are supplied from the same mains, they will get 14-candle gas. The suburbs, probably, will gain in importance during the next few years, and we hope to have a great accession to our private lighting. The Committee in Calcutta have been very zealous in the management of the business, and have given us and Mr. Blackburn every assistance. Of Mr. Blackburn I wish to say a few words. His services are specially mentioned in the report. Last year was one of unusual labour and anxiety for him, both as to the completion of the new gasholder and the carrying on of the negotiations for the new contract. Those negotiations were carried on with two separate public bodies—one for the town and the other for the suburbs—and they have entirely met with our approval. The Directors were in constant communication, postal and telegraphic, with Mr. Blackburn respecting the contracts, and they can speak most highly of the tact and ability with which he carried out our instructions. Partly desiring to benefit his health, which had been tried by the strain of hard work, and also to have the benefit of the expression of his personal views as to the probable working of the Company under the new contract, the Directors sanctioned his visit to England during the past autumn, and we have been enabled to get much valuable information from him, and to arrange a good deal about the plant and apparatus. He was in Calcutta again, we hope, yesterday, and no doubt is now busily engaged in preparing the plans for the new pipes and other works. About the dividend I need not say much. I am happy to be able to inform you that we keep up the rate that we paid last year—namely, 9 per cent. We might have given you a little more, but we did not think it advisable in the present precarious state of the exchanges. It will be seen that we have added £2000 to our reserve-fund, and I think that is all I have to say about the different items in the accounts. I have now just to tell you what the Calcutta Committee say at the close of their report, as I did last year: "The Committee observe with much pleasure the satisfactory increase in the revenue of the Company during the past year, and they look forward with confidence that the year now commencing will show even better results. The large extension to the Company's mains which is proposed, for the supply of gas to the new lamps for Calcutta and the suburbs, should have the result of bringing in a considerable accession of new consumers, to whom gas has not, up to this time, been available; and the large number of new street-lamps to be erected within the year will also assist to increase the revenue." That is their report, and I think it is very satisfactory. Before I sit down, perhaps I may say a few words about the electric light. I think everybody in the room knows as much about it as I do, and I think the Shareholders will draw the same conclusion as I and my brother Directors do—namely, that gas has nothing to fear from it. It seems very questionable whether it will supersede gas, both from the inherent difficulties of the operation and from its great cost. Even if the light is used in England it seems next to impossible that it can be used in Calcutta, where the streets are generally narrow and tortuous, and where there are very few large open spaces, or large buildings; nor will the Calcutta community be at all satisfied with an increase of some 200 or 300 per cent. in their lighting assessment, and this is what they would have to pay for the luxury. I beg to move that the report and accounts now presented be received and adopted.

Mr. W. White, in seconding the motion, congratulated the Shareholders on the position the Company had attained by the renewal of their contract. The matter had been under consideration for more than 18 months, and it had given the Directors a great deal of anxiety; but they had at last been successful in carrying it out in a manner satisfactory both to the Shareholders and to themselves.

A Shareholder asked when the new contract would come into operation.

The Chairman: On the 1st of May, 1880.

A Shareholder asked how the reserve-fund was invested.

The Chairman said it was invested in the Company's working capital, and was yielding 9 per cent. interest.

A Shareholder: Then it is not available if you require it for any particular emergency?

The Chairman said that he did not know of any emergency likely to arise.

Mr. Northover said the loss on exchange was very much to be deplored, but he supposed that there was not likely to be any improvement until the export trade in India increased. There had been some talk of revival of gold currency, but he did not know whether that would take place or not. The report spoke of the "stringent conditions" to which the Company were subjected in the new contract. He hoped that there were no conditions except those that could be reasonably overcome. He wished also to draw attention to the large amount of loans on debentures. He supposed that the Directors could not help it; but he certainly should like to see, on some future occasion, either that the amount was reduced or that the Directors would come forward with some proposition whereby it might be reduced by creating something like preference stock. He was not a scientific man, but he had given some little attention to the subject of the electric light, and he thoroughly believed that the light was not going to supersede gas. In small places, gas would always hold its own.

There were at the present time no less than ten different systems of electric lighting. This showed that scientific men were not at one with regard to this extraordinary power. The number of inventors of machines for generating the electricity was still greater. All that was wanted on the part of Directors was as much enterprise as they could throw into their business, and to avail themselves of all that science could do far them. There was, perhaps, no limit to what science could do with regard to gas; but there was a limit to the electric light, because it was ruled by the laws of danger. There was a great deal of danger attending the use of the electric light. In the Wallace light, the particles of carbon might fly off and set fire to the carpets, or to ladies dresses. There was also great loss in the transmission of electric force, while gas, he understood, could be conducted twelve miles without losing much of its illuminating power. Electricity could not be stored as gas could; and at Billingsgate, the other day, a little nail getting into the machinery prevented the electric light being used at all. It was impossible to have a machine for generating this light without also having an attendant, and people would not like to have an attendant always in their houses. Still, he thought it might be used in certain localities, and he had heard that Herr Krupp was using it in his factory, and said it was cheaper than gas. Probably it was so in that case, because Herr Krupp had all the machinery necessary for its production. Mr. Werdermann was going to give them an account of how a row of houses might be lit up with the electric light; but that gentleman anticipated as much difficulty in the matter as they did themselves. The more he studied the subject, the more certain he felt that Gas Shareholders had nothing to fear as far as their dividends were concerned. He did not think that their shares would ever stand in the market as they had done, because they had been far too high; but he thought that they might look forward to a certain 7½ to 10 per cent. in most Companies that were properly conducted. The residual products were increasing in importance, and although it was true that for a considerable period coke had been a drug, he hoped for better times and better prices. He noticed that in America there had not, comparatively speaking, been any panic, although all the trouble in England had been caused by the news received from America. It was said that Mr. Edison was going to tell them how to touch a little spring, and before they could cry "Jack Robinson" they would have a light; but Mr. Edison himself now doubted whether he should be able to make the electric light cheaper than gas.

Mr. Stokes said Sir Julian Goldsmid had stated that the cost of the electric light was five times greater than that of gas, and all Gas Companies need do was to keep up the quality and reduce the price as low as possible. With regard to the danger attending the use of the electric light, if the wire became disconnected from the lamp, it would melt the brass, and the light would fall down. The current was so extraordinarily strong that it would melt anything with which it came in contact. He felt sure that in a very short time gas shares would regain their old price. When railways were first started, it was said that horses would be almost given away; but subsequent events had shown that this prediction had not been realized.

Mr. Northover said that the shares of the French Electricity Company, which were formerly dealt in at a very high premium, were now below par.

The Chairman, in reply to the observations that had been made, said that the "stringent conditions" referred to the impurities. In the previous contract there were no such conditions and no fines, and they could supply what kind of gas they pleased. Still, the Directors had been careful not to commit themselves to anything which they could not easily carry out. As regarded the debenture bonds, the Board had been considering whether they could convert them into preference shares; but, at present, they had not come to any determination about it. Some objected to preference shares, while if they turned the bonds into ordinary shares they would have to pay 9 instead of 4¾ per cent.

The motion for the adoption of the report was then put and was agreed to.

The Chairman then moved the re-election of the retiring Directors, Mr. Henry M'Lauchlan Backler and Mr. John Robinson Peill.

The motion was seconded by Mr. Hill, and agreed to.

Mr. Backler thanked the Shareholders for re-electing him. He was sure that all the Directors had the prosperity of the Company at heart, and left nothing undone to secure it. He had taken a great interest in the electric light. It should be remembered that the light required to be very carefully watched, and it was necessary to keep an eye always upon it, and a hand on the gas-tap close by, so that the faithful gas might be brought into action whenever the electric light went out.

On the motion of Mr. Milledge, seconded by Mr. Garey, Mr. T. N. Stokes and Mr. H. L. Hammack were re-elected Auditors.

Mr. Hammack, in responding, assured the meeting that the dividend was thoroughly well earned.

The Chairman moved—"That a dividend of 9 per cent., for the twelve months ending the 30th of June last, be declared, and that the same be paid, free of income-tax, on the 4th of December, less 4 per cent. paid, on account, on the 4th of June last."

Mr. Peill seconded the motion, which was agreed to.

Mr. Northover said he wished to refer to the valuable services rendered to the Company by their Engineer and Manager, Mr. Blackburn. They all felt that he had done everything that could be done by a person in his position to benefit the Company; and if the Directors saw fit to present him with some emolument beyond his ordinary salary, he was sure that the Shareholders would gladly consent to it.

The Chairman said that the Board had given Mr. Blackburn a *douceur*, with which he had gone away perfectly happy.

On the motion of the Chairman, seconded by Mr. Backler, the thanks of the meeting were accorded to the Calcutta Committee, for their attention to the local interests of the Company.

Mr. Stokes proposed a vote of thanks to the Secretary, which was unanimously agreed to.

Mr. Solomon proposed a vote of thanks to the Chairman and Directors, who, he said, had placed the Company in a position of security for the next 21 years. They had watched every detail of the concern, and he was sure that with their supervision the business of the Company would become very remunerative

The motion was seconded by Mr. Northover, and unanimously agreed to.

The Chairman, on behalf of his colleagues and himself, thanked the meeting for their vote, and expressed his hope that the Board would deserve a similar one next year.

The Secretary, on behalf of himself and Mr. Blackburn, thanked the meeting for their kind expressions. It was a matter of great regret to Mr. Blackburn that he could not prolong his stay in England, so as to be present at the meeting; but before he went he assured him that the Company stood in an exceptionally advantageous position with regard to the electric light in Calcutta.

The proceedings then terminated.

LAMBETH WATER-WORKS COMPANY.

The Ordinary Half-yearly General Meeting of this Company was held on Tuesday last, the 26th ult., when the following report of the Directors was presented —

The Accounts for the half year ending Sept. 30, 1878, certified as correct by the Auditor appointed by the Board of Trade under the Metropolis Water Act, 1871, and by the Auditors of the Company, are hereto annexed.

During the half year 1441 houses and other supplies have been laid on to the Company's works at a rental of £3009 5s.

The capital account shows an expenditure for the half year of £7412 19s. The debit balance of £1642 15s. on the 30th of September includes the value of stocks in hand.

The bond and debenture debt was £141,765 on the 30th of September, but has been since reduced by £18,100.

£75,000 had been paid on account of the 4 per cent. debenture stock at the end of the half year. This amount has been increased by a fourth issue of £25,000, which was paid in full on the 1st of November. Applications were received on account of this issue for £54,185 from 122 Proprietors, holding £238,785 share capital. The allotment was made by the Directors proportionately, according to the holdings of shares as before, and they will make further issues as may be necessary.

The surplus transferred from the revenue account to the dividend and interest account is £51,980 4s. 11d. After the payment of interest on bonds and debentures and debenture stock, there remains an available sum of £40,182 18s. 9d. The Directors propose to transfer £2500 to the contingency fund, in part repayment of the amount taken therefrom in March, 1877, and recommend to the Proprietors the distribution of a dividend for the half year ended the 30th of September last, at the rate of 6½ per cent. per annum, which will, it is estimated, amount to £34,627, leaving a balance of £3055 to be carried forward.

The Engineer reports that two of the old 60 H.P. engines at Brixton are undergoing alteration as regards the substitution of surface for jet condensers, which will result in the saving of a large quantity of filtered water, at present unavoidably wasted; and that in other respects the whole of the works, including reservoirs, filters, engines, mains, and pipes, are in good order and efficient working condition.

The number of houses to which constant supply has been already given in the No. 1 division in Newington during the half year is about 600. This system will be continuously, and as fast as practicable, extended throughout the whole of the Company's district.

The Government Water Examiner having reported from time to time that the rate of filtration at the Company's works was too rapid, the Directors have entered into a contract with a responsible contractor for the construction of the necessary works on the Company's land at Ditton, to give effectual filtration to a large volume of water. This extension and improvement of the area of filtration will complete the efficiency of the Company's works as a whole.

The Directors have to report that the Thames Conservators obtained an Act in the last session of Parliament whereby each of the Metropolitan Water-Works Companies, drawing water from the Thames, is compelled to contribute a further annual sum of £1000 towards the funds of the Conservancy. The Directors regret this further incumbrance, but, at the same time, believe that the increased funds of the Conservators will better enable them to maintain the purity of the Thames water, and so to benefit the Companies.

The Metropolitan Board of Works have signified their intention of again seeking parliamentary powers to acquire the Water Companies, provided the Government will support their attempt. The Government will, no doubt, fully and fairly consider the matter whenever it comes before them. Whatever course events may take, the Proprietors of the Lambeth Water-Works are happily in a position to maintain that, although a Commercial Company, they have always considered the public interest as of paramount importance. But for the enterprising spirit displayed during the last 30 years, in extending pipes wherever they were required, often in localities where there was no immediate prospect of their being remunerative, some of the now most favoured and populous suburbs in the South of London would, owing to the distance and height of the required services, have been at a very great disadvantage in respect of water supply, and their development thereby considerably retarded. The Company's parliamentary territory involves, perhaps, the most difficult service of any of the Metropolitan districts. The supply is most efficient at present, and the Directors are always ready to extend it, when required, to any part of the district, as well as to adopt the best means for maintaining the purity of the water. The attention of the Directors and officers has, of late, been somewhat diverted by harassing and expensive parliamentary contests, but it is satisfactory to observe that a steady improvement goes on in every way.

Dr.—Revenue Account, for the Half Year ended Sept. 30, 1878.

Maintenance.						
To Maintenance and repair of impounding and service reservoirs, filtering-beds, works, and pipes, or for obtaining and storing of water, including the cost of materials and labour	£1180	4	3			
Maintenance and repair of mains, pipes, fittings, meters, and works connected with distribution of water, including the cost of materials, labour, and renewals	4,783	0	0			
Pumping and engine charges, including cost of coals, wages, &c.	9,621	17	7			
Filtration, including the cost of materials and labour	498	3	3			
Salaries of Engineer (or Superintendent) and Clerks, and wages of Inspectors and Turncocks	2,708	15	7			
Rents of houses and lands, accrued due to date, and owing by the Company	155	12	6			
Thames Conservancy	626	0	0			
Rates and taxes	3,657	11	11			
				£23,231	5	1
Management.						
Allowance to Directors	£918	15	0			
Allowance to Company's Auditors	32	3	1			
Salaries of Secretary, Accountant, and Office Clerks	1,095	4	2			
Superannuations of servants of the Company	465	17	1			
Commission to Collectors	1,617	10	10			
Stationery, printing, and general establishment charges	326	1	0			
Law and parliamentary (opposition) expenses	457	9	10			
Official Auditor and Water Examiner	68	8	9			
				4,981	9	9
Dividend and interest account for transfer of profits				41,980	4	11
Balance carried to next account to provide for losses				5,000	0	0
				£75,192	19	9

Cr.—Revenue Account.

By Balance brought from former account				£4,400	0	0
Add surcharges on rental to Lady-Day, 1878				561	17	5
				£4,961	17	5
Less sums written off as losses, viz.— Empty houses, houses cut off, and bad debts				4,337	8	9
				£624	8	8
Water-rents accrued to the date of this account				74,540	6	1
Rents of houses and lands accrued due to date, and owing to the Company				19	15	0
Fees received for registration of shares, transfers, &c.				8	10	0
				£75,192	19	9

The Proposed Purchase of the Exeter Gas-Works by the Corporation.—The statutory meeting of ratepayers, called under the provisions of the Borough Funds Act, for the purpose of considering and, if so decided, to consent to the promotion, in the ensuing session of Parliament, of a Bill to authorize the purchase, by the Mayor and Town Council of Exeter, of the undertaking of the Exeter Gas Company, was held on Tuesday last, when the Mayor presided. The opponents of the purchase mustered in considerable force, and the meeting was altogether a scene of much noise and disorder. The Mayor formally moved a resolution in favour of the purchase, and was supported by Aldermen Richards and Thomas, the ex-Mayor. The great majority of those present were, however, in opposition, and, on the motion being put, it was declared lost, amid tumultuous applause. A poll was demanded, and it will be taken in due course.

THE SUPPLY OF GAS-STOVES BY THE LEEDS CORPORATION.

At a Special Meeting of the Leeds Town Council on Wednesday last—Alderman ADDYMAN in the chair,

Alderman BOWER, Chairman of the Gas Committee, moved that the Council recommend the Parliamentary Committee, in conducting the proposed Improvement Bill, to withdraw therefrom, at the proper time, the provisions relating to the supply of gas-stoves. He said it would be remembered that the Gas Committee passed a resolution, which was adopted by the Council, to insert in the proposed Improvement Bill a clause giving the Corporation powers to supply gas-stoves, either by renting them or without charge, as might from time to time be determined by the Council. In the clause as it stood in the Bill, words were inserted that they were not only to have these powers, but powers to "manufacture gas and other stoves." Now, it was never the intention of the Gas Committee, or the Council, to take upon themselves the business of manufacturing gas-stoves, and with regard to "other stoves," he did not know the meaning of those words in the clause. He supposed an oven might be called a stove, and certainly it was not the intention of the Council, or the Gas Committee, to include such stoves. Seeing that these words had appeared in the notice, the subject came before the Gas Committee at their last meeting, and they determined to ask the Council to adopt a resolution to withdraw, at the proper time, the provisions relating to the supply of gas-stoves. He was quite sure these stoves would be a benefit to the town, and he was equally satisfied that it was not the intention of the Gas Committee, or the Council, to interfere with any trade by becoming the sellers of stoves. Rather than decrease the sale, he believed that if these powers had been obtained, many persons would have purchased their own stoves, and the trade would have been increased.

Mr. A. BROWN seconded the motion.

A discussion ensued, in which a considerable number of the members took part, one of them remarking that it had been said in the Committee that there was a good deal of opposition to this clause outside, and in deference to public opinion they were withdrawing it.

Upon a division, the motion was agreed to, only five members voting against it.

ARTIFICIAL LIGHT.

The First Meeting for the present session of the Portsmouth Literary and Scientific Society was held on Tuesday, the 12th of November, under the presidency of Mr. JOHN DOUGLAS, F.C.S., Engineer of the Portsea Island Gas Company, and one of the Vice-Presidents of the British Association of Gas Managers.

After the nomination of new members,

The PRESIDENT said, that as this was the first meeting of the Society for the present season, it became his duty to thank the members for placing him in that honourable and responsible position, which he had accepted with sincere pleasure. It was also his duty to ask their indulgence, as, owing to physical weakness, he could not read his own address; but his esteemed friend, Mr. F. W. Hartley, one of the Council of the Society of Engineers of London, had kindly undertaken to read the address and present the demonstrations to them.

Mr. HARTLEY said he felt sorrow and satisfaction at having to fulfil this duty—sorrow that Mr. Douglas could not personally do justice to his paper, and satisfaction that such a compliment should have been paid to him. He felt unable to render the Address with the same significance as the President would have done, yet, as he took an especial interest in the subject, he would do his best. He then read the following paper:—

Ladies and Gentlemen,—The subject to which I venture to call your attention to-night, and to which, at the present time, many minds are directed, some with fear, some with hope, all with curiosity and interest, is the group of practical and scientific questions comprehended under the term "Artificial Light," by which I understand the illuminating method by means of which we carry on our daily life after the sun has ceased to give his natural light. It is not too much, I think, to say that but for artificial light, civilization could not have made such rapid advances. In fact, the first step generally taken towards civilization is some mode of public illumination. It may be conceded generally that to man in a state of nature—"When wild in woods the noble savage ran"—artificial light was required only for exceptional and temporary purposes, and such light would most easily and readily be obtained by the blazing faggot snatched from the camp fire, and thus we can see that the first artificial light was probably obtained from resinous wood, such as I hold in my hand. When to protect themselves from the weather or for the purposes of society or security, man began to dwell in huts or caves, a more permanent illumination would be required, and doubtless it would be observed that the fats and oils of animals slain in the chase afforded light when fired, and placing these fats and oils in shells, with fibres from twigs, would give rise to lamps, which only required occasional supplies of the oily or fatty matter to give light for many hours. Shells from the sea-shore, or the skull of the animal itself, were probably also utilized for the vessel in which to contain the oil or fat required for the lamp, and to this day the shell of the "roaring buckie" is used by the cottagers of Zetland as their household lamp. When pottery and metal came into vogue, the same principle of these natural lamps was retained, just as in our own day methods adopted from a different state of society leave some relic of their original stamped upon the utensils or apparatus employed.

There is very little doubt it is to the earlier races of India that we are indebted for the invention of lamps, and so little ingenuity was exercised upon them that for thousands of years the lamp retained its original form. I hold in my hand a lamp, made of clay, found in the ruins of Pompeii, and you will observe how little it differs in shape from the lamp used by the maidens of India to forecast their fate, each taking her lamp, and, after lighting it, setting it afloat on the Ganges, when if it burned clear and steady till lost in the distance, she foresees love, honour, and troops of friends; while her companion, whose lamp is gone down in the current a short distance from the shore, is in despair at the prospect of losing all she holds dear. Among the northern nations of Europe, where the cold is intense, and where limpid oils were apt to solidify, the solid fat of animals was placed in stone cups, with a wick in the centre, so that the fat melted as the wick burned down, much in the same way as a child's night-light is used at the present day.

Very little improvement was effected in lamps so long as the capillary attraction of the wick alone was relied on to draw up the oil to the point of combustion. At the beginning of this century the old principle was abandoned by two French lamp-makers, whose names have since become famous—Messrs. Argand and Carcel. The principle of M. Argand's lamp I shall have to refer to a little later, and, therefore, it is enough to call your attention to the French moderator lamp, which is a vast improvement on its smoky predecessors. M. Carcel's lamp consisted of clockwork, which raised the oil up tubes in connection with the wick, so that the latter was kept continually soaked. I have here a Carcel lamp, which gives, as you see, a capital light, well sustained and brilliant, for seven or eight hours. So satisfactorily, indeed, is the regularity of its consumption of oil, and purity and constancy of light, that the Carcel lamp has been adopted in France as the standard by which to compare and measure the light obtained from other sources.

The facts of the fats available for illumination being frequently solid, early gave rise to the cylinder with a central wick, which we commonly call a candle. Candles are made principally of the solid fat of animals, called tallow, or of the solid portions of palm and cocoa-nut oils, or of bleached wax, or of spermaceti. Composite candles are obtained by washing the tallow with lime water. The fatty acid of the tallow is thus separated, forming stearine, which, as you see, is hard, crystalline, perfectly dry and free from greasiness, and having a somewhat pearly lustre. Formerly, the difficulty of moulding these candles, on account of their crystalline character, was got over by mixing a little arsenic with the stearine; but the poisonous fumes evolved, during the process of burning, were found to be exceedingly hurtful, and now only a little wax is used. I have here a common tallow candle and a composite, and you will understand they are made of the same substance, but with this difference, that in the latter the tallow has been washed with lime water, and a little wax added to make it more easily moulded.

But that my subject deals only with candles from the point of view of light givers, it would interest and amuse the members of our Society to trace their origin as religious symbols, probably relics of the ancient fire worship, and to name a few of the superstitious notions attached to them. At this very day there are not wanting people who, when they see the tallow rising up against the wick of the candle, exclaim, "It is a winding sheet," and regard it as a sure omen of death in the family. Others, again, look upon a bright spark in the wick as a sign that the person sitting opposite it is to receive a letter. Windy weather is prophesied if the candle-flame waves without apparent cause, and wet weather if the wick does not light readily. In some countries candles are placed on the dead bodies of friends by loving hands, in the firm belief that they will ward off the evil spirits who are always on the alert to injure the souls of those quitting the world.

It is time now to refer to the chemical operations which take place in the combustion of those substances which have thus been used to give artificial light. Flame, as you know, arises from the chemical union of two gases, which combine so energetically as to produce light and heat. Two gases may produce heat, but little or no light. Let me go one step further, and say all bodies are compounded of two elements, one we call matter, the other force. What matter is no one can tell, we know it only by our sensations. Of what force consists we are equally ignorant. We only know it from its phenomena; but we do know that, according to these phenomena, we call it light, heat, or electricity, and we know also that these are interchangeable terms, light and heat being convertible into each other, and both being convertible into electricity, and *vice versâ*. If, therefore, two gases, each being composed of a certain amount of matter along with a certain amount of force, combine, and the resulting new body has no need of the aggregate amount of force contained in both bodies, the unrequired force is liberated, and, if very active, appears in the form of light and heat, and produces the phenomena of combustion. Flame is the result of the combination of two gases; incandescence, the combination of a gas and a solid.

Turning now to the instances we have had before us, organic substances consist mainly of the gas hydrogen, and the solid carbon, very loosely combined. When I apply the necessary amount of heat, the hydrogen is liberated from the grasp of the carbon, and enters into active combination with the oxygen of the atmosphere, producing heat and light; the heat so produced serves to liberate a further quantity of hydrogen from the unaffected portions of the body, and thus the operation goes on till the whole body is chemically decomposed. The solid carbon meeting with the oxygen becomes incandescent, and adds its quota to the total sum of the light-giving power.

Let us for a moment look at our friends in this view: 1, Resinous wood; 2, lamp (oil); 3 candle. In the latter two the sole use of the wick is to bring the material that is to be decomposed to the point of combustion.

We have now arrived at the next great step in the progress of artificial lighting—the discovery of common coal gas. If I have succeeded in carrying you with me, you will have observed that the idea of artificial light, from the ordinary methods, consists in obtaining a gas that will unite actively with the oxygen of the air, so as to produce light and heat, and then to add to their heat of combustion particles of carbon which, by its incandescence, gives additional light. We are never so successful as when we follow the teachings of nature. In the case of the lamp and candle, nature produced her own gas as an element of the oil or fat to be consumed—the gas hydrogen. But when we try to follow nature's dictates we are not tied down to hydrogen alone. What we want is a gas that will unite with the oxygen of the air and emit heat enough to render the carbon particles incandescent or white hot. Now, there are three such gases—hydrogen, carbonic oxide, and marsh gas or light carburetted hydrogen. When these unite with the oxygen of the air, as they do now, they give out heat, each of them exceeding 1900° Fahr. You will observe they practically give no light. They merely supply the heat which causes the carbon particles to become white hot and give the light. The most important of these three gases for the purpose of artificial light is carbonic oxide, because its thermal power is nearly 1200° Fahr. greater than hydrogen, whereas hydrogen and marsh gas have nearly the same thermal power. Having obtained any of these gases, all I have to do, in order to obtain artificial light, is to add small particles of carbon or other combustible solid. To illustrate this, I shake carbon dust into the flame, and you observe that, immediately the particles of carbon come into contact with the blue flame, they become white and give light. A similiar result ensues with magnesia, and I can effect the same object by passing this current of hydrogen through a tube containing naphtha, which supplies the gas with the carbon particles in which it is deficient, and thus at once you see the luminosity is produced. In the examples given the solids employed have, on combustion, produced a light tending to whiteness. I may remark, however, that the colours of luminous flames depend on the nature of the solid burned with the thermal gases, and upon the temperature at which combustion is effected. Thus by burning a little of the metal in these flames a fine red is obtained, while with copper a fine green results. Again, sodium, which I can burn without the aid of the thermal gases, gives a monochromatic flame, by the light of which colours are indistinguishable. Reverting to coal gas, it consists of the three thermal gases—hydrogen, carbonic oxide, and marsh gas or light carburetted hydrogen, with the addition of carbon particles. There is also in coal a gas rich in carbon particles, called olefiant gas, so rich indeed in carbon that its thermal power is insufficient to render incandescent all the carbon it contains, and it is therefore capable of parting with some of them to the thermal gases which, with the exception of light carburetted hydrogen, are absolutely without them—another instance of the usual harmonious partnerships we so often see in nature, like husband and wife, the one making up for the deficiencies of the other, the result being a happy home.

If you carry your minds to the idea that the measure of the artificial light obtained from coal gas is the heat produced from the thermal gases in their combination with the oxygen of the air, you will at once understand that if the thermal gases come into contact with too much air, which con-

tains one-fifth of its bulk only, the rest being nitrogen which is a non-supporter of combustion, the result will be the non-heating of the carbon particles, and a loss of luminosity accordingly. This is familiar to you, where a coal gas flame burns quite blue when it is injected into the air by having too much pressure. On the other hand, if the supply of oxygen is limited unduly, the carbon passes off in smoke. The conditions, then, under which the thermal gases are combined with the oxygen of the air greatly affect the amount of light emitted by the carbon particles, and this is the secret of the quantity of light obtained from any burner on M. Argand's principle, as adapted by Mr. Sugg to the consumption of coal gas. With this burner all the parts, even to the chimneys, are proportioned to the quantity and quality of the gas to be burned. It is possible, by using an unduly long chimney, to reduce the flame in length and weaken the light, or by turning the gas too strongly on to render the air supply insufficient and produce smoke. You observe, however, that on increasing the length of the chimney, the balance is again restored; but, as the circulation is now too active, the result is not economical.

The amount of ignorance displayed by consumers of coal gas, on the subject of proper burners, is almost past belief, were it not that it is found daily by the officers of gas companies to be the most prolific cause of complaint of defective lighting. If it is borne in mind that the one point to be obtained is the proper mixture of the thermal gases and oxygen of the air, consumers would, of themselves, arrive at a sensible conclusion. Instead of that, however, consumers go on in what is termed an "anyhow" style—the burners are either enlarged to abnormal dimensions by pins and watch springs, or neglected altogether till they are entirely worn out and useless. I have here burners actually taken from houses in this neighbourhood, and if you compare them with the results obtained from good burners, you will observe the immense loss of light occasioned by this neglect or ignorance.

Another curious fact in connection with the proper combustion of the thermal gases is that, the larger the body of flame, the more light is obtained per foot of gas consumed. For instance, one burner consuming 10 cubic feet of gas per hour will give absolutely more light than ten burners consuming each 1 foot, or five burners each consuming 2 feet, or two burners each consuming 5 feet. The burner (Argand) now before you consumes about 5 feet per hour, and is now giving a light equal to about 15 candles, or about three candles per foot of gas per hour, whereas a burner burning 50 cubic feet of gas per hour gives about 250 candles, or 5 candles per foot of gas per hour, so that if the gas could be consumed as economically in the small burner as in the large, this Argand would give the light not of 15 candles, but of 25 candles. I cannot but think that some such adaptation as this would be useful in economically lighting large open spaces, and I am in hopes of having a burner constructed to burn 500 feet per hour, and give a light equal to 3000 candles. The practical difficulty is that, unless a burner of that magnitude is accompanied by efficient reflectors, a great part of the light is wasted by passing upwards into space, and so serving no useful purpose.

Before finally quitting the subject of burners, I must mention an ingenious adaptation of the Argand mode, by Mr. Greville, of Bude, and called the Bude burner. This burner in its day made a great sensation, and it was used to light the House of Commons through a transparent ceiling. The principle on which it depended was the admission into the centre of an Argand flame a stream of oxygen instead of air, thus increasing the intensity of the combustion of the thermal gases and *pari passu* the "white heatedness," if I may coin a term, of the carbon particles.

I have dwelt upon carbon particles as the primary cause of the luminosity of a coal-gas flame. But any substance will act equally well which is capable of being raised to a white heat.

The Drummond light was once in vogue, and it was anticipated would supersede the present use of coal gas. Who now ever dreams of the Drummond light, except as the lime light for magic-lantern shows and brilliant scenes in a pantomime? The principle on which the Drummond light is constructed is the same as I have been endeavouring to elucidate in the case of coal gas. We have first the thermal gas, represented by ordinary coal gas, or hydrogen, combining with oxygen, and the heated flame caused to impinge on a lime ball, which becomes heated to a white heat emitting the light exemplified by experiment.

Hitherto I have dealt with the union of gases producing heat, which is converted into light by the agency of carbon, but I must not omit a species of artificial light produced by the union of a solid with a gas. It is well known that magnesium has an intense avidity for oxygen, and in the combination so much unrequired force is thrown off as to produce a very bright light. I have here a coil of magnesium ribbon, and you will observe that the light produced by its oxidation is very pure and bright. It was at one time hoped that magnesium lamps would come into general use—at least, for photographic purposes—but they have completely died out, and I was unable to obtain one anywhere.

I come now to the most important, although the most recent, development of my subject—the use of electricity. [And here I must discriminate between the use of electricity as a gas lighter and as an actual illuminant. Most of you may have heard of the lamps in Pall Mall having been lighted almost simultaneously by electricity. The invention is that of Mr. St. George Lane Fox, and he has kindly allowed me to exhibit it to you as applied to three lamps in this room.] I come now to the most recent advance in artificial illumination—the electric light. The method of obtaining light from the voltaic arc is not new, as from a very early date in the history of electrical discovery it has been known. Two carbon electrodes are used, between the extremities of which a series of sparks play, producing the light exhibited. What is new, however, and what has given a remarkable impetus to this species of illumination, is the invention of methods of producing electricity in great volume, and with remarkable continuousness, if not cheapness, and absence of fluctuation, by means of steam power. Many machines for producing electricity by induction have been invented and used; but to a Frenchman, M. Gramme, is due the credit of inventing the machine which is most widely accepted as the best.

It is no part of my plan to describe the method of obtaining electric light. It is enough to present it to you. The main difficulty is not the development of the electricity, but the production and adjustment of the carbon electrodes, between the points of which the voltaic arc is produced. Carbon being incandescent at high temperatures, the mere burning of the carbons causes them to shorten, and to thus increase the distance over which the current has, as it were, to leap; and the difficulty is still further increased by the fact that the positive electrode consumes away twice as rapidly as the negative. This difficulty has been overcome by ingenious mechanism operating automatically. The regulator before you is the invention of Mr. Browning, of the Strand, London, and seems well adapted to its purpose.

The practical difficulties in the way of the general use of the electric light are as follows:—1. The difficulty of obtaining and adjusting the carbons. Their uniform maufacture is difficult and expensive, but hopes are held out that incombustible electrodes will be discovered, which will avoid all necessity for adjustment. 2. The necessity of having the generating source within a limited distance of the light itself. Lieut.-Col. Haywood, in his report to the City of London Common Council, says the electric candle cannot be used more than 1000 yards from the magneto-electric apparatus. With the electrode candle this is probably correct, but with electrodes offering less resistance a greater distance may be calculated upon. If the 1000 yards be a fact, then all electric lighting for the purposes of general illumination must be far distant. It is not so much the electrodes which offer resistance in long distances, as the resistance of the conducting wires, and lateral waste by diffusion and induction. 3. The inability to divide the current, or lower or alter its intensity at a series of centres, and at the same time reduce the expenditure of power, and alteration in the intensity of allied light, supplied from the same electro-magnetic machine. It is asserted that the division has been accomplished by a Mr. Werdermann, but I have not had an opportunity of seeing his system at work. He does not, however, profess to be able to lower or alter the intensity of the light, so that, once in use, it must remain at its existing intensity, or be extinguished completely. 4. The want of storeage. There is no proposal as yet, except an unconfirmed assertion from Mr. Reed, that it is possible to store electricity, and draw it off as required; but if additional lights are required, the only method is to increase the speed of the motor, or add an additional number of cells to the battery.

When these difficulties are pointed out to the partizans of the electric light (and it is astonishing what partizanship is displayed in the discussion of this simple question), the reply is invariably that, no doubt, the ingenuity of our inventors and scientific men will arrange something to obviate and overcome all difficulties. This species of faith may serve a temporary purpose, but we are in no sense justified in acting upon it. Coal gas has now been in use, as an illuminating agent, since the date of the Battle of Waterloo. The Portsea Island Gaslight Company were formed in 1821 to supply this borough with coal gas, and to this day the older methods of illumination, in the form of lamps and candles, are more in vogue than they were then.

I am continually asked, will not the electric light supersede gas and gas-works? And, naturally, persons who have invested their capital on the faith of a continuance of the demand for gas, eagerly snatch at any item of news which may tend to solve the problem. In reply, I say advisedly, that if the *vis inertia*, the natural conservatism of the community, remains as it was in 1815, whatever the advantages of the electric light, there are very few in this room, if any, who will see gas superseded. No doubt the same ingenuity which it is expected will be devoted to the development of the electric light will be expended on the development of gas, in the same way that the introduction of gas stimulated improvement in the forms of lamps, and the materials used in them.

There is one point in connection with the electric light which has never yet received full examination—the question of cost. We have had vague and indefinite announcements from France that it costs one-third, one-fourth, or one-half of the cost of gas. But these statements are entirely misleading to people in England. The price of gas in Paris is 5s. 6d. per 1000 cubic feet, and in the provinces as much as 7s. or 8s.; whereas here in Portsmouth it is only 3s. 8d., and in parts of London 3s., besides being in the large towns of Manchester, Birmingham, and Liverpool not much greater, if any.

I admit freely that there is a sphere in which the electric light may and will be serviceable, but that sphere is entirely outside the sphere in which gas is most useful. The electric light undoubtedly is adapted to large open spaces, but not for domestic consumption. Possibly for large workshops, where motive power at present exists, it may be found economical, but for "rich radiance," as Mr. Sprague reports, there is nothing to equal gas.

In my judgment, the gas companies may welcome the electric light as a friend and a brother, not as a rival; and if its introduction tends to economy in the manufacture of gas, it will have done more for the public benefit than by threatening to supersede it. Let me corroborate this opinion by a quotation from the greatest authority on the subject in France—M. Hippolyte Fontaine: "In this century, when progress is so rapid, many persons do not await the sanction of experience before exalting a new invention to the detriment of all others. These persons have scarcely had time to admire the marvellous effects of gas lighting before they salute the dawn of electric lighting, by proclaiming that it is a hundred times more economical than the former, that we can employ it everywhere, distribute it indefinitely, and that its light is as beautiful and intense as the sun itself." Again, he says: "We ignore surprises that the future may reserve for us; but our knowledge of the subject leads us to affirm that the *rôle* of electricity is far from its full development, especially from the point of view of the transformation of motion into light. It is not of so much importance to know what will be as to know what is."

The view I have all along taken of this controversy is very simple, and I venture here to repeat what I have said in a previous part of this Address. The terms heat, light, and electricity are all names for the same thing, which we call combined force, and each is capable of being converted into the other. Thus, we may assert the axiom that the cheapest source of heat will always be the cheapest source of light and of electricity. Now, we readily accept the fact that, for centuries to come, the cheapest source of heat must be coal, the foundation and builder-up of England's greatness. Therefore, coal will be our cheapest source of light for centuries to come, and the question resolves itself into this: Is the conversion of coal into light most conveniently and economically done by converting it into gas, or by producing the electric light? At present all the results obtained tend to show that the greatest economy is obtained by converting the coal into gas, and not by burning it to actuate a steam motor with which to generate electricity. In some special cases of convenience and risk, the question of economy may be neglected; but for all the ordinary purposes of daily life, gas will be found the most economical, and the most easily manipulated.

[The Address was illustrated by a number of interesting experiments, special arrangements having been made for practically exemplifying the various methods of illumination described by the President. A handsome gasholder, containing 10 cubic feet of gas, had been temporarily erected on the left side of the platform, on which was an extemporised counter fitted with a series of gas-jets, and magnesium and electric-light apparatus; while at three corners of the gallery, gas columns with lamps had been fixed, and connected with the platform by electric wire, that they might be simultaneously illuminated and extinguished, as is being publicly carried on, on an extensive scale, in Pall Mall, according to the patent of Mr. St. G. Lane Fox. The experiments commenced with the firing of a resinous piece of wood, a primitive and barbarous method of illumination, and, passing to a clay lamp recovered from the ruins of Pompeii, illustrated, in chronological succession, the development of light down to the present day. Proof was furnished of the waste of gas and defective illumination resulting from bad burners, and of the diminution of flame that follows upon the use of glass chimneys disproportionately elongated; at the same time that much interest was taken in the experiments with chemicals to show how they variously affected the colour of flame. The Drummond lamp, commonly known as the magnesium light, was effectively used, and in its illuminating intensity was generally compared with the electric light, in the rays of which motes could be detected from a sidelong position. The effect of the electric light upon the eye was similar to that produced by the rays of an August sun, and so dazzling

was its brilliancy that the shadows thrown upon the walls were not merely adumbrated, as would be the case with gas, but defined in a manner that was really astonishing. It was quite a relief to the majority of those present, who had been guarding their eyes from its continuous glare, to have its intensity modified by the illumination of a column lamp in the centre of the hall, giving a powerful but not hurtful light, with a consumption of 50 feet of gas per hour, and exemplifying the advantages of a broad flame compared with a number of small jets.]

Major-General FREESE proposed a hearty vote of thanks to the President. He said that it was seldom a lecture given to the Society afforded them so much knowledge and amusement, and he was sure all present would not only join in his proposition, but also in the opinion that they were fortunate in having so able and learned a President. The able manner in which Mr. Hartley had carried out the experiments, and read the paper, must also be acknowledged.

Mr. W. B. ROBINSON seconded the vote, which was carried by acclamation.

The PRESIDENT, in response, said that the hearty vote of thanks was a complete reward for any trouble he had taken. After the delivery of a Presidential Address, it was not usual to enter upon a discussion, and, therefore, he simply adhered to the words he had written. He had taken considerable pains to present to them every form of illumination, and he was exceedingly glad that Mr. Hartley had read his paper so well, and carried out the experiments so satisfactorily. He should have been glad to have fulfilled his duty himself, but, being unable, had secured a good substitute, to whom their cordial thanks were due. The paper had been written with painstaking care, knowing the responsibility which rested upon his opinion. That opinion he endorsed as much as he ever did, and he thought he could advance even stronger reasons for it than those he had already given. His own future, and that of many with him, was dependent upon the views he took, and time alone would show who were in the right.

THE CITY OF PARIS AND THE ELECTRIC LIGHT.

[Translated from *L'Industrie*.]

We informed our readers a few days since, that the Municipal Council of Paris, at their sitting on the 7th of November, authorized the prolongation, until the end of the month, of the experiments that were being made with the electric light in the Avenue de l'Opéra and the Palais Bourbon. These experiments, as is well known, commenced on the 1st of May, on the opening of the Exhibition, and were to terminate with its close on the 10th of November.

We were far from being opposed to the principle of these experiments; on the contrary, we believe they have been very useful for the general edification. We were, however, perfectly justified in asking how long it was proposed to continue them. Without mentioning the not inconsiderable expense they occasioned to the Municipality, we wished to call attention to the fact that after having been carried on for some six months they possessed but little practical value, and were even productive of serious inconveniences—they were, in fact, disturbing vested interests—the interests of many respectable families who, on the faith of treaties, had embarked their savings in the organization of a great public industry—namely, the lighting of the principal towns and cities by gas.

In the course of the discussion relative to the prolongation of these experiments, the Prefect of the Seine may have said, with the characteristic generosity of a Frenchman, that Paris had esteemed it an honour to make the first experiments, on a large scale, with this new scientific discovery. It is true that the electric light imparted additional brilliancy to the city—it was an object of attraction to foreigners, whom we wished to induce to visit the Exhibition. But the experiment was continued when all that was past. Six months of electric lighting, or rather of attempts at electric lighting, had not taught us anything beyond this—that the invention is a curious one in several respects, that it may render good service in certain circumstances, but that it is totally unfit for the general lighting of a city, not merely on account of its high price, but also, and especially, on the score of its irregularity, its inconstancy, and its fragility. Has not all this been recognized and proved alike by our own specialists and by the foreign engineers who have visited us, and some of whom, on returning to their respective countries, have published reports on what they saw and studied, with the greatest care and attention, during their stay in Paris.

It could not even be said that any progress towards perfection had resulted from these lighting experiments. There were, just as in May last, the same oscillations, the same changes of colour, and, what was a still more serious matter, sudden and complete extinctions of the light occurring repeatedly in many of the apparatus fitted up in various parts of Paris. How was it, then, that the Prefect of the Seine considered it desirable to sanction the continuation of these experiments?

Paris has shown herself generous in the matter of the electric light, but that is the business of the Municipal Council. We would only say that, in our opinion, a limit should be observed even in generosity. Besides, will not the inhabitants, or rather the ratepayers, of Paris be struck with this fact, that the Municipal Administration were actually assisting a Company whose success would have for its very first effect the production of serious disturbance in the finances of the city? Electric lighting is considerably more expensive than gas—it costs about seven times as much—and if the former system were permanently adopted by the Municipality, they would not only have to pay more for the public lighting than they now pay the Paris Gas Company, but would also lose several million francs a year on the *octroi* duties.

Once more, then, we ask, Has not a fair trial been made with the light? Do we not possess all the elements requisite to enable us to form an opinion on its merits? Then why further have prolonged an experiment which had no other object than to serve the purposes of a private Company, to the detriment of the general interests of the inhabitants of Paris, whose burdens are already so heavy?

[At the sitting of the Municipal Council above referred to, it was stated by M. Mallet, one of the Directors of the Paris Gas Company, and a Member of the Committee of the Société Technique de l'Industrie du Gaz en France, that the cost of each electric light ranged from 1 fr. 25 c. to 1 fr. 75 c. (say 1s. to 1s. 6d.) per hour, and that the prolongation of the lighting experiments would cost the city something like 15,000 frs. (£600), which, he remarked, might be more judiciously employed, inasmuch as for that amount from 75 to 100 additional gaslights might be obtained.]

Register of New Patents.

APPLICATIONS FOR LETTERS PATENT.

4626.—FOX, St. G. L., Telegraph Street, London, "Improvements in the means or apparatus for obtaining light by electricity, and distributing, regulating, and measuring the electric currents for the same." Nov. 14, 1878.

4635.—WELCH, E. J. C., Manchester, "Improvements in apparatus for dividing and distributing electric currents for lighting and other purposes." Nov. 15, 1878.

4645.—SELLON, J. S., Hatton Garden, LADD, W., and EDMUNDS, H., Beak Street, London, "Improved means for obtaining electric light." Nov. 15, 1878.

4646.—SELLON, J. S., Hatton Garden, LADD, W., and EDMUNDS, H., Beak Street, London, "Improvements in electric lamps." Nov. 15, 1878.

4652.—HADDAN, H. J., Westminster, "Improvements in steam-pumps." A communication. Nov. 16, 1878.

4662.—SPRAGUE, J. T., Birmingham, "Improvements in producing the electric light, and in lamps applicable to that and other sources of illumination." Nov. 16, 1878.

4670.—GWYNNE, J., Hammersmith, London, "Improvements in centrifugal or other pumps." Nov. 18, 1878.

4671.—SCOTT, W. L., Wolverhampton, Stafford, "Improvements in the production, regulation, and distribution of electric and electro-calcic lights." Nov. 18, 1878.

4689.—WELCH, E. J. C., Manchester, "Improvements in apparatus for producing the electric light." Nov. 19, 1878.

4690.—JOHNSON, J. H., Lincoln's Inn Fields, London, "Improvements relating to electric regulators, lamps, or candles." A communication. Nov. 19, 1878.

4693.—RIEMENSCHNEIDER, A., and CHRISTENSEN, F. S., Nestved, Denmark, "Dividing electric light and apparatus therefor." Nov. 19, 1878.

4700.—MILLER, A., sen. and jun., Glasgow, "Improvements in the manufacture of illuminating gas, and in the utilization of the impure products resulting therefrom." Nov. 19, 1878.

Share List of Gas and Water Companies.

(*Corrected by Mr.* F. N. GOLDING, *Sun Court, Cornhill, from the latest Stock Exchange Quotations.*)

Number of Shares issued.	Amount per Share.	Name.	Amount paid up per Share.	Last Divd. p.Cent. p. Ann.	Latest Quotations.
	£	GAS COMPANIES.	£ s. d	£ s. d	£
589392	10	Alliance and Dublin	10 0 0	10 0 0	13¾—14¾
10000	20	Anglo-Romano . .	20 0 0	10 0 0	20—24
5000	20	Bahia (Limited). .	20 0 0	3 0 0	9—11
.000	20	Do., do., redeem.	20 0 0	10 0 0	25—27
1500	20	Do., 2nd pref. . .	20 0 0	7 10 0	18—20
40000	5	Bombay (Limited).	5 0 0	7 10 0	5¼—5¾
10000	5	Do., fourth issue.	4 0 0	7 0 0	3—4
5000	20	Bournemouth . . .	10 0 0	7 0 0	..
229700	..	Brentford	100 0 0	9 0 0	140—150
..	..	Do., 5 per ct. pref.	100 0 0	5 0 0	90—93
..	20	Do., C shares . .	16 0 0	9 0 0	3—4 pm.
5400	20	Brighton	20 0 0	10 0 0	24—25
5000	20	Brighton and Hove	20 0 0	10 0 0	24—26
13000	20	British (Limited) .	20 0 0	10 0 0	29—31
7223	20	Cagliari (Limited).	20 0 0	6 0 0	16—18
1500	10	Colney Hatch . . .	10 0 0	5 0 0	9—10
5500001.	Sk.	Commercial	100 0 0	10 0 0	150—155
70000	100	Do., 7 per cent. .	100 0 0	7 0 0	110—120
20000	20	Continental Union.	20 0 0	6 0 0	15⅝—16⅝
2000	0	Do., new	12 10 0	6 0 0	5–3 dis.
10000	20	Do., preference .	20 0 0	7 0 0	21—22
75000	Sk.	Crystal Palace Dist.	100 0 0	10 0 0	150—155
125000	Sk.	Do., 7 per cent. .	100 0 0	7 0 0	115—125
50000	Sk.	Do., preference .	100 0 0	6 0 0	105—115
7100	25	Edinburgh	25 0 0	10 0 0	42—45
23406	10	European (Limited)	10 0 0	10 0 0	12¼—14¼
12000	10	Do., new shares.	7 10 0	10 0 0	2—3 pm.
35406	10	Do., new shares .	5 0 0	10 0 0	1½-2 pm.
4094840l.	Sk.	Gaslight & Coke A.	100 0 0	10 0 0	151—153
1000001.	Sk.	Do. B.	100 0 0	4 0 0	70—75
50000	10	Do. 5 per ct. pref. conv., 4th issue.	10 0 0	5 0 0	13¼—13⅝
50000	10	Do. do., 5th do. .	6 0 0	5 0 0	2⅞-3¼pm
2000001.	Sk.	Do. C 10 p.c. pref.	100 0 0	10 0 0	183—186
300000l.	,,	Do. D do. do. .	100 0 0	10 0 0	183—186
165000l.	,,	Do. E do. do. .	100 0 0	10 0 0	183—186
30000l.	,,	Do. F 5 do. do. .	100 0 0	5 0 0	90—95
60000l.	,,	Do. G 7¼ do. do. .	100 0 0	7 10 0	130—140
1300000l	,,	Do. H	100 0 0	7 0 0	107—112
6200	5	Georgetown, Guiana	5 0 0	5 0 0	..
300000	100	Glasgow Corporation Gas	100 0 0	9 0 0	200—205
115000	100	Do., do.	100 0 0	6 15 0	150—155
	100	Grimsby Gas, A. .	100 0 0	..	182—187
7000	10	Hampton Court . .	10 0 0	10 0 0	12—14
5000	10	Hong Kong ; Lim.)	10 0 0	10 0 0	14—16
5000	10	Hornsey	10 0 0	10 0 0	..
200000	50	Imperl. Continental	100 0 0	5l.p.sh.	148—152 xd.
..	..	Kingston	..	..	..
..	..	Lea Bridge	..	..	..
9000	4	Limerick Gas . . .	4 0 0	2 10 0	2—2½
561001.	100	Liverpool United .	100 0 0	10 0 0	150—152
1691001.	100	Do., B	100 0 0	7 0 0	120—123
3849001.	Sk.	London	100 0 0	10 0 0	150—155
1622501.	Sk.	Do., 1st pref. . .	100 0 0	6 0 0	105—115
14450	Sk.	Do., 2nd pref. . .	100 0 0	6 0 0	100—106
7622	25	Do., A shares . .	25 0 0	6 0 0	24—26
266921.	All	Do., Debent. stk.	100 0 0	5l.& 6l.	..
15000	5	Malta and Mediterranean (Limited).	5 0 0	2 10 0	2—2½
6000	5	Do., preference .	5 0 0	7 10 0	5—6
20000	5	Mauritius (Limited)	2 5 0	2 10 0	1¾-1¾ dis
25000	20	Monte Video (Lim.)	20 0 0	8 0 0	12—13
8000	10	Nictheroy, Braz.(L.)	10 0 0	5 0 0	..
30000	5	Oriental (Calcutta).	5 0 0	9 10 0	5¾—6¼
30000	5	Do., new shares .	3 0 0	9 10 0	par-¼pm
10000	5	Ottoman (Limited).	5 0 0	3 0 0	2—2½
10000	10	Parà (Limited) . .	10 0 0	3 0 0	4—5
27000	20	Phœnix	20 0 0	10 0 0	29—31
3600001.	100	Do., new max. 7½	80 0 0	7 10 0	85—95
1440001.	Sk.	Do., capitalized .	100 0 0	5 0 0	80—90
	20	Do., new, 1876. .	16 0 0	10 0 0	7—8 pm.
	..	Richmond (Surrey)	..	..	..
37500	25	Rio de Janeiro (L.)	20 0 0	10 0 0	18—20
1500	32½	Shanghai	32 10 0	12 0 0	..
	100	Sheffield, A	100 0 0	10 0 0	172—173
	100	Do., C	100 0 0	10 0 0	171—173
12500	5	Singapore (Limited)	5 0 0	7 10 0	5¼—5¾
2000	5	Do., preference .	5 0 0	7 10 0	5¾—6¼
4000	50	South Metropolitan	50 0 0	11 0 0	87—90
4000	12½	Do.	12 10 0	11 0 0	21—23
20000	12½	Do., new shares .	12 10 0	11 0 0	21—23
15000	10	Surrey Consumers.	10 0 0	10 0 0	14—15
10000	10	Do., new	8 0 0	10 0 0	3-4 pm.
..	5	Tottenham and Edmonton	5 0 0	10 0 0	10¼—11
1500	10	Wandsw. & Putney	10 0 0	10 0 0	14½—15
1500	10	Do.	10 0 0	7 10 0	10¼—11¼
4000	10	Do.	10 0 0	7 0 0	..
..	..	West Kent	..	..	..
..	..	Woolwich, Plmstd., and Charlton . .	..	..	..
26000	5	West Ham	5 0 0	10 0 0	7—8
		WATER COMPANIES.			
615600	100	Chelsea	100 0 0	6 0 0	152—155
1624700	100	East London . . .	100 0 0	6 0 0	152—155
10798	50	Grand Junction . .	50 0 0	5 0 0	83—87
5840	25	Do., ½ shares . .	25 0 0	5 0 0	41¼—42¼
6160	25	Do., new ditto; max. div.,7½ p.c.	25 0 0	5 0 0	37—39
5551801.	100	Kent	100 0 0	8 0 0	207—215
7818001.	100	Lambeth	100 0 0	6 5 0	152—156
3261501.	100	Do., max.,7½ p.c.	100 0 0	6 5 0	147—151
442	100	New River	100 0 0	7 0 0	320—350
4475	100	Do.	85 0 0	7 0 0	280—300
400000	100	Do.,deb.sk.,4 p.c.	100 0 0	4 0 0	101—103
6668001.	100	Southwrk. & Vauxh.	100 0 0	2 0 0	107—110
3247001.	100	Do., pref. stock .	100 0 0	5 0 0	113—114
1265001.	100	Do., D shares . .	100 0 0	4 0 0	105—108
700001.	100	Do., new ordinary	..	4 10 0	..
1600	100	Do., new ord. No.1	40 0 0	4 10 0	..
15073	61	West Middlesex . .	61 0 0	6l.p.sh.	138—142

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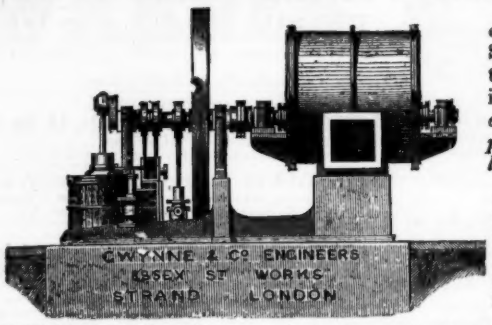

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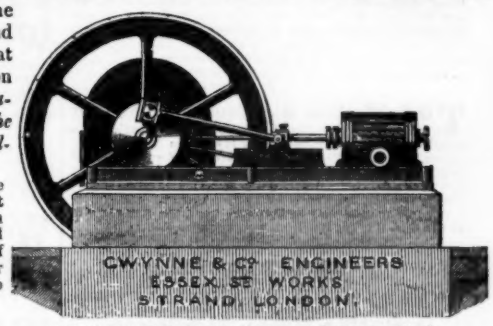

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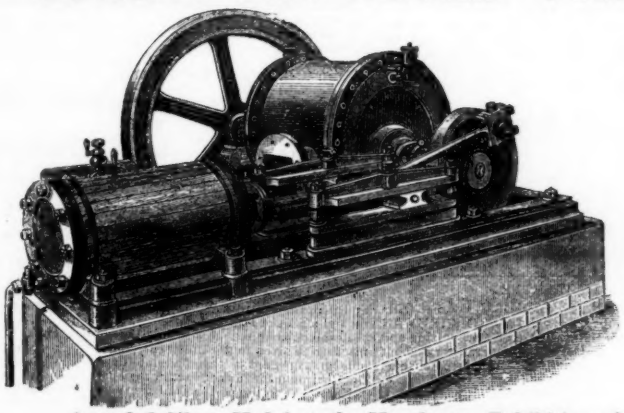

WITH

Wrought-Iron Spindles and

ENGINES COMBINED.

SOLE MAKERS,

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MAKERS OF ENGINES, EXHAUSTERS, INDEX AND DISC GAS-VALVES, HYDRAULIC MAIN VALVES, BYE-PASS VALVES, TAR, LIQUOR, AND OTHER PUMPS, SCRUBBERS AND PURIFIERS, CONDENSERS, BOILERS, &c.

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TO GAS ENGINEERS.

D. BRUCE PEEBLES & CO.

Beg to call the attention of Gas Engineers to the fact that the novel and original feature in connection with PEEBLES' SYSTEM OF CONTROLLING THE ACTION OF GAS GOVERNORS is the loading or acting on the Bell by Pneumatic Pressure instead of Weights.

TAY WORKS. BONNINGTON, EDINBURGH.

IMPROVED PATENT COMPENSATING GAS-METERS,

MANUFACTURED BY

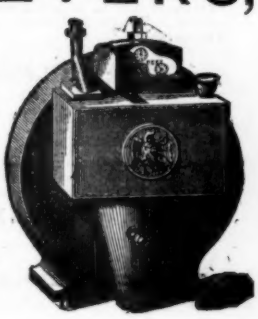
THE IMPERIAL METER COMPANY,

LIMITED,

And adopted by the principal Metropolitan and Provincial Gas Companies as being by far the simplest Compensating Meters.

In this Wet Meter the drum or wheel is of the plain ordinary form, and not cut up or divided out into a complicated series of chambers, and there is an absence of overhung or other revolving apparatus to effect the compensatory action.

Without increasing the size of the Meter, a reservoir for compensating the water is provided, which, under ordinary conditions, will, without attention, keep the Meter working for ten to twelve months with an unvarying water-line.



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KING'S ROAD, ST. PANCRAS, LONDON.

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LEIGH GAS-WORKS.

THIS Freehold Wharf on the Thames with half-finished Gas-Works, with Steam Power, to be Sold or Let on Lease.
Apply to W. FOSTER, Leigh, ESSEX.

TO IRON FOUNDERS, &c.

THE Leigh Local Board, Lancs., invite TENDERS for 35 Retort Mouthpieces, Ascension-Pipes, Bridge-Pipes, &c., Wrought-Iron Hydraulic Mains, and Wrought-Iron Foul Main; particulars of which may be obtained on application to the Engineer.
Tenders to be delivered on or before Dec. 16, 1878, addressed to Chairman of the Gas Committee.
The lowest tender not necessarily accepted.
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THE Woolton Gas Company have for disposal a quantity of GAS PLANT suitable for a small Gas-Works. Consisting of Hydraulic Main, Mouthpieces, Ascension-Pipes, 6-in. Condensers, Scrubber, set of four Purifiers, 5 ft. square and 3 ft. deep, with Grids and Centre-Valve, complete. All the above is in good order, having recently been replaced by larger plant.
All information may be obtained from the undersigned, at the Gas-Works, Woolton, near Liverpool.
HENRY HATCH, Manager.

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CONSULTING GAS ENGINEER,
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Reports and Valuations in the Management, Construction, and Structural Value of Gas-Works.

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TAR DISTILLERS & MANUFACTURING CHEMISTS,
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BUYERS OF COAL TAR,
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AMMONIACAL LIQUOR, &c.

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ANALYSES OF SCOTCH COALS, CANNEL, SPLINT, SHALE, &c., USED in the MANUFACTURE of GAS. By WILLIAM WALLACE, Ph. D., F.R.S.E., F.C.S., &c., Public Analyst and Gas Examiner for the City of Glasgow.

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HOPKINS, GILKES, & CO.,
LIMITED,
MIDDLESBOROUGH,
SUPPLY GAS & WATER PIPES of EVERY SIZE.
Plain, Turned and Bored, and Coated.
CAST-IRON RETORTS.
Castings for Gas-Works of every description.
EXHAUSTERS.
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THE ELECTRIC LIGHT.
LETTERS ADDRESSED TO THE EDITOR OF THE "JOURNAL OF GAS LIGHTING," &c., BY
Mr. W. LIVESEY, Secretary of the Gas and Water Company's Association, and
Mr. F. W. HARTLEY, A. Inst. C.E., M.S.E., &c.
Reprinted in pamphlet form, for Gas Companies to distribute among their Shareholders, &c.
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AN increased yield of gas, and of augmented illuminating power, is obtained by employing WHITE'S AUTOMATIC VALVE, and dispensing with the Hydraulic Main, the tar of which, as is well known, absorbs the rich constituents of the gas, consequently, diminishes alike the quantity and quality.
Further particulars, &c., upon application to WILLIAM WHITE, Gas-Works, Abersychan, MON.
A Pamphlet descriptive of the above method, post free, 6½d.

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MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.
Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.
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ENGINEERS AND CONTRACTORS
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GAS AND WATER-WORKS,
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REFERENCES TO UPWARDS OF 400 WORKS.

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WANTED, by Advertiser, aged 26, a Re-engagement as METER INSPECTOR, Complaint Fitter, Meter Fixer, &c. Good references.
Address ONYX, care of Waller, 1, New Park Road, BRIXTON HILL, S.W.

WANTED, a firm to undertake the Manufacture of a New Patent Gas Engine, which combines many points of superiority over other engines.
Apply, in the first instance, by letter, to No. 511, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, after Christmas, a Situation as CLERK or ASSISTANT MANAGER. Five and a half years in Iron-Works, and two in entire charge of Gas-Works.
Address No. 508, care of Mr. King, 11, Bolt Court, Fleet Street, LONDON, E.C.

WANTED, in the Gas-Works of a fashionable watering place on the South Coast, four good, steady Men as STOKERS for scoop work. 33s. per week.
Apply, by letter, to No. 512, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED immediately, a Person competent to act as SUPERINTENDENT and FOREMAN of a Gas-Works. Make about 30 millions. Must have a thorough practical knowledge of apparatus connected with Manufacture and Distribution. A mechanical engineer preferred. Wages £2 per week.
Address WILSON AND DOUGLAS, ALDERSHOT.

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WANTED, by the Tottenham and Edmonton Gas Company, a steady, experienced MAN as SERVICE LAYER. Must be competent at Meter Fixing, also able to read the indices of meters.
Apply, by letter, in own handwriting, to W. H. H. BROADBERRY, Engineer, Gas-Works, TOTTENHAM.

WANTED, by Samuel Thompson & Co., Colliery Office, Lancaster, APPLICATION for PRICES from Gas Managers who are prepared to receive Tenders for GAS COAL or CANNEL.
John Leigh, Esq., M.R.C.S., F.C.S., &c., &c., in his analytical report of S. T. & Co.'s Coal, says: "It is remarkable for its purity, I have scarcely ever examined a Coal containing so small a quantity of ash, and when Cannel of the best description is scarce, it may well replace this material."

AN Engineer and Manager of Gas- Works who has had 20 years experience in the Management and Construction of both large and small works, the Manufacture of Residuals into almost all the marketable forms, and who has a thorough practical acquaintance with fittings and apparatus for heating and cooking, desires a re-engagement. Would have no objection to go to any healthy climate abroad. Ref rences of the most satisfactory character can be given.
Address A. B., care of W. H. Bennett, 22, Great George Street, WESTMINSTER, S.W.

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REQUIRED for the Bombay Gas Company Works at Bombay, a general YARD FOREMAN having a thorough practical knowledge of Carbonizing and Setting of Clay Retorts, as well as the general work about a Gas-Works. Wages 200 rupees per month, free house on the works, with fire and gas and passage out and home. One who has been accustomed to Foreman's duties preferred. Engagement for five years, subject to certain conditions as to qualifications.
Applications, by letter only, addressed to the SECRETARY of the Bombay Gas Company, Limited, 4, Great Winchester Street, LONDON, with testimonials (copies only, and which will not be returned), to be made on or before the 1st of January next.

TO GAS PROPRIETORS AND ENGINEERS.

RE-ENGAGEMENT is sought by a practical, energetic Manager—formerly for 16 years with the late Edwin Unwin, Esq., Sheffield Gas Company—or to assist in large Works in any department.
Thorough knowledge of Carbonizing, Fitting, Meters, Mains, Photometer, and of Colonial Gas-Works.
Very satisfactory references and reasons for change will be sent on application to No. 506, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

FOR SALE.—One 10 ft. square by 5 ft. deep Cast-Iron PURIFIER, with 10-in. Inlet and Outlet Connections. Also One 10-in. CENTRE-VALVE, equal to new.
Apply at the Gas-Works, Bromley, KENT.

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FIRE-CLAY Retorts, ovals, 14 by 22 (inside), perfect, for SALE cheap.
SAMUEL HAYWARD, New Park Street, LONDON, S.E.

CAST-IRON Borings, best quality, any quantity, delivered to any railway station in England.
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STATION-METER FOR SALE.

THE Gas Committee of the Rochdale Corporation offer for SALE a STATION-METER, capacity 25,000 cubic feet per hour, 12-in. Connections, Hydraulic Valves, and Bye-Pass, and all other necessary fittings. The Meter to be removed in consequence of extensions.
Any further information thereon can be had from the Manager at the Works.
Tenders, endorsed "Tender for Station-Meter," must be sent to me. By order,
ZACH. MELLOR, Town Clerk.
Town Hall, Rochdale, Aug. 2, 1878.

BOROUGH OF HALIFAX.

THE Gas Committee of the Halifax Corporation invite TENDERS and DESIGNS for a CYLINDRICAL TOWER SCRUBBER to be 60 ft. high and 12 ft. in diameter, with 18-in. Valves and Connections, Staircase, &c., all complete; to pass 60,000 cubic feet per hour.
The Contractor must state price per ton at which he will supply and fix the necessary 18-in. pipes and connections for connecting the Scrubber with the rest of the apparatus.
Further particulars may be had from Mr. Wm. Carr, Manager, at the Gas-Works.
Tenders must be sent to me on or before Thursday, Dec. 26, 1878. By order,
A. C. FOSTER, Town Clerk.
Town Hall, Halifax, Nov. 30, 1878.

IMPERIAL CONTINENTAL GAS ASSOCIATION.
(INCORPORATED BY ACT OF PARLIAMENT.)
The HALF-YEARLY ORDINARY MEETING of the Imperial Continental Gas Association was held at the City Terminus Hotel, Cannon Street, London, on Tuesday, the 28th inst.,
SIR JULIAN GOLDSMID, Bart, M.P., Chairman,
Resolved unanimously—"That the Report upon the affairs of the Association be received, adopted, and enter on the minutes."
Resolved unanimously—"That a dividend of £5 per cent. be declared upon the £2,890,000 capital stock of the Association for the half year ended the 30th of June last, and that the said dividend be payable, free of income-tax, on and after the 14th of December next."
Resolved unanimously—"That the cordial thanks of the meeting be given to the President, and Directors, for their able management of the affairs of the Association, and to the Chairman for his conduct in the chair this day."
Upon the motion of the Chairman, a vote of thanks was also given to Mr. G. W. Drory, Consulting Manager, and to Mr. L. G. Drory, and to Mr. Wiugfield, and the other Officers of the Association.
ALBERT F. JACKSON, Secretary.
By order of the Board.
30, Clement's Lane, Lombard Street,
London, E.C., Nov. 27, 1878.

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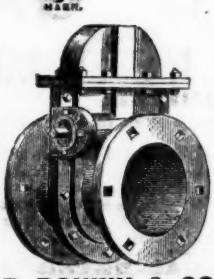
Manufacturers of FIRE-BRICKS, LUMPS, TILES,

AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.
N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

B. DONKIN & CO.'S
IMPROVED GAS-VALVES
WITH WROUGHT-IRON PINIONS.



List of prices, with full dimensions of all sizes up to 48-inch, to be had on application.
These Valves are proved on both sides to 30 lbs. on the square inch before leaving the works, and are kept in stock.
In ordering Valves, please state whether required for under or above ground, and if to be with flanges or spigots and sockets cast on, or with separate spigot and socket pieces.
ALSO SOLE MAKERS OF
J. BEALE'S NEW PATENT GAS EXHAUSTERS,
AND MAKERS OF
STEAM-ENGINES FOR DRIVING GAS EXHAUSTERS,
VALVES FOR AMMONIACAL LIQUOR,
IMPROVED BRIDGE VALVES FOR REGULATING THE SEAL IN HYDRAULIC MAINS,
BYE-PASS VALVES, SCREW WATER-VALVES, &c.

B. DONKIN & CO., 55a, BLUE ANCHOR ROAD, BERMONDSEY, LONDON, S.E.

THE

WARNER & COWAN METER.

THE largely increasing demand for this Meter, to the exclusion of others with drums of the ordinary kind, fully justifies our opinion of its merits, and warrants our belief that the time is not far distant when the common drum will cease to be made for any form of Meter.

There is now no other reason for its use than that founded on the trifling difference between its price and that of the Warner and Cowan—a consideration which we have repeatedly shown ought to have no weight whatever, because most sizes of the Warner and Cowan only exceed by 10 per cent. the price of the common Meter, while the gain to the seller of gas who uses the former, amounts *yearly* to not less than the 10 per cent. he pays, once for all, as its additional cost.

The extra registration of gas by the Warner and Cowan is fully proved, and has been realized in comparison with the most carefully watered ordinary and also compensating Meters of the best description.

The Patentees have recently granted a licence for France and Belgium, to the Compagnie Anonyme Continentale of Paris, Lyons, Bordeaux, Lille, Brussels, the Hague; Milan, Naples, and Rome (J. Brunt and Co.), on terms which sufficiently show the high estimation in which the Warner and Cowan principle is held on the Continent, where the well-known firm of Messrs. Faas and Co., of Frankfort and Vienna, work the patents for Germany and Austria.

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WET & DRY GAS-METER MANUFACTURERS,

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The Silber Tubulated Gas-Burner.

The *World* says: "The light given by these Burners, besides being abundant in quantity, is almost like sunlight in its quality, so that it produces the same spectrum when refracted through a prism, and allows even the most delicate shades of colour to be distinguished."

Dr. W. WALLACE, F.R.S.E., F.C.S., says: "It gives the steadiest flame of any Argand yet constructed."—*Vide* Report presented to the Dublin Meeting of the British Association, Aug. 15, 1878, "On the Best Means for the Development of Light from Coal Gas of Different Qualities."

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The Silber Tubulated Gas-Burner, with Opal Shade and Cup and Governor attached.

The *London Medical Record* says: "This uniform blending of the air with each part of the flame results in rendering it pure and white, and very considerably lessens the blue colour, which is significant of waste, and which is very plainly visible at the base of all imperfect lights. The creation and the maintenance of this white light—not yellow light—is a proof of perfect combustion.

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The *Sanitary Record* says: "Mr. Silber's improvements render it possible to eliminate, as far as is practicable, the sulphuric acid due to the incomplete combustion of impure gas."

The *British Medical Journal* says: "In the whole of Mr. Silber's inventions there is noticeable a complete attention to, and adoption of, natural laws."

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ON THE

SCIENCE AND PRACTICE OF THE MANUFACTURE & DISTRIBUTION

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This Volume contains 460 pages of Letterpress, and is illustrated by 521 Woodcuts and 36 page and double-page Engravings, printed on Plate paper, and a full-page

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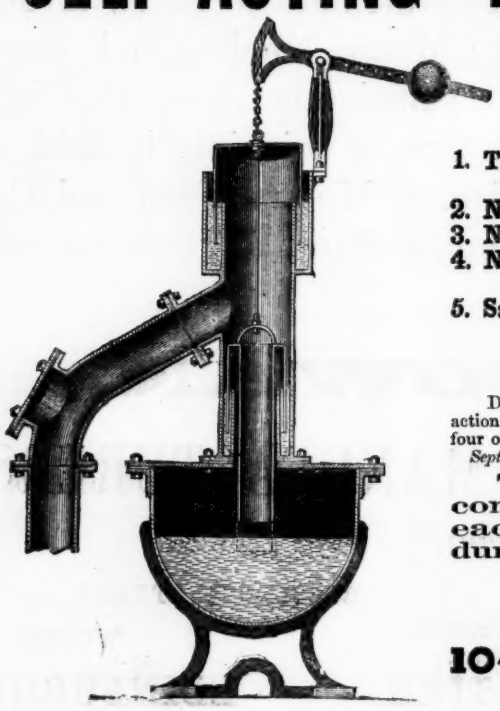

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1. There is no pressure on the Retorts.
2. No deposit of Carbon.
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4. Never a choked Ascension-Pipe.
5. Saves Fuel and Wear and Tear.
6. Gets 10 per cent. more Gas out of the Coal, and a higher Illuminating Power.
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9. Is perfectly automatic in its action.

Testimonial from the Proprietor of the Apeldorn Gas-Works.

DEAR SIR,—In reply to your inquiry, the Self-Acting Dip-Pipes, which have been in action at my works for two years, give entire satisfaction. I forward you order for four others.

Yours truly,

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These Dip-Pipes can now be supplied complete, except the flanched bend, for £4 each, which includes the charge for licence during the whole term of the patent.

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Who fix the Dip-Pipes, at a small Charge, when required.

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DIRECT FROM THE

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Hot Water Tubes, Core Bars, Lap-welded Iron Boiler Tubes.

CAST-IRON PIPES for GAS & WATER.

Brass and Gun-Metal Fittings. Valves, Cutting and Screwing Tools, &c.

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Public Accountant,

15, UNION COURT,

OLD BROAD STREET, E.C.

Mr. ROBERT DEMPSTER, Sen.,

CONSULTING GAS ENGINEER,

Of Messrs. Robert Dempster and Sons, Rose Mount Gas Engineering Works,

ELLAND, near HALIFAX,

May be consulted on all matters connected with Valuations, Arbitrations, and Parliamentary Applications connected with Gas-Works. Our R. D., Sen., having been engaged on extensive Arbitration Cases, which, combined with his experience in Construction and Contracting, his knowledge of Engineering and Valuations, is both extensive and reliable.

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Samples on application.

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Will be glad to supply the above on the most favourable terms, and to treat, by Purchase or Exchange, for Spent Oxide.

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PARIS EXHIBITION,

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Being the Highest Honour given for this class.

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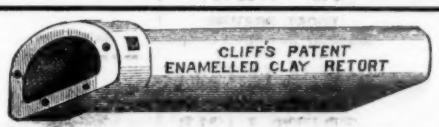

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BY

OXIDE OF IRON.

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Beg to draw the attention of Gas Companies to the following certificate, relative to the quantity and quality of their Oxide, from the Assistant Surveyor of the County of Donegal:—

"*Londonderry, Oct.* 12, 1878.

"I have examined some of the deposits of iron ore in the following localities in the county of Donegal, over which Messrs. Cooke Brothers hold exclusive royalties for raising the ore—namely, several townlands in the Barony of Kilmacrenan, including the estate of Viscount Southwell, in the Barony of Raphoe, the estates of Sir Samuel Hayes and Colonel Montgomery, in the Barony of Ennishowen, several townlands on the estate of Mr. Newton—and I certify that the several estates are rich in Oxide; that the ore is of a very good quality, such as is usually shipped from this county; that the districts, which are very extensive, are capable of producing a large supply; in fact, the supply of ore on these estates is practically inexhaustible.

(Signed) "PHILIP M'LAUGHLIN, *Assistant County Surveyor.*"

COOKE BROTHERS beg to state they are also in possession of several other exclusive sources of supply, independent of those included in the above certificate.

26, 27, *and* 28, *Fenchurch Street, London, E.C., Oct.*, 1878.

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SPECIAL ACCOUNTANT FOR GAS COMPANIES,
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The Forms of Account, which have been specially designed to meet the requirements of the Gas-Works Clauses Amendment Act, 1871, are now in use by many Gas Companies, and have been universally approved.
The above forms are registered.
Water Companies Accounts also prepared and adjusted.
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YEO'S PATENT ENGINE PACKING,

Price 1s. 8d. per lb., any size.
Tarred & White Spun Yarn for Pipe Joints, at various prices.
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MANUFACTURERS OF
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COTSWOOD FIRE-BRICK WORKS, SCOTSWOOD-ON-TYNE.
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Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.
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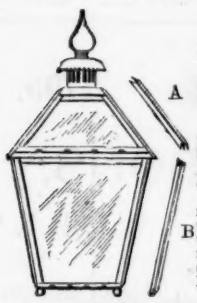

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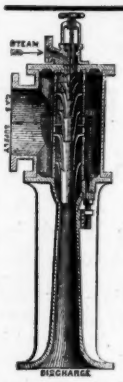

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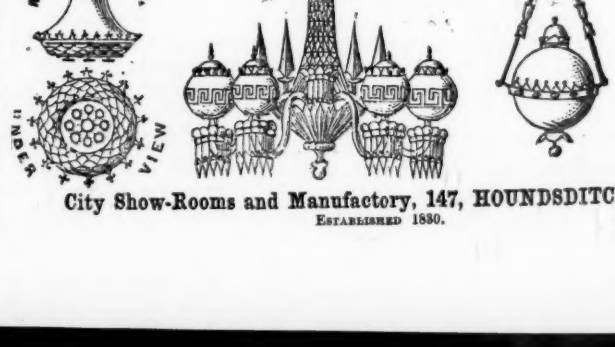

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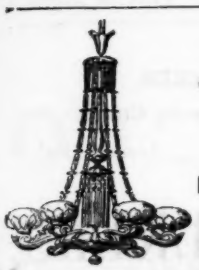

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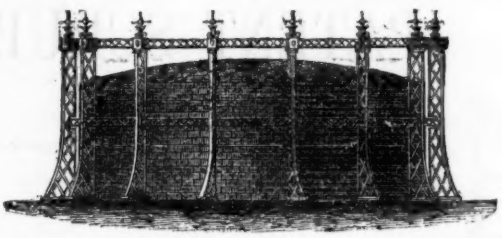

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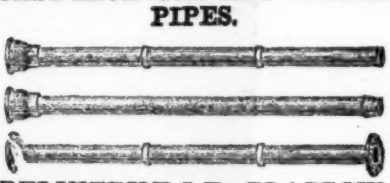

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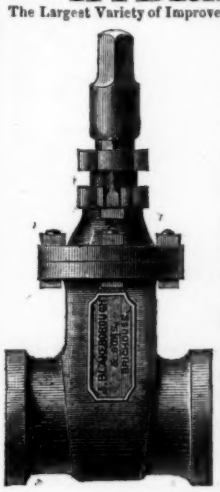

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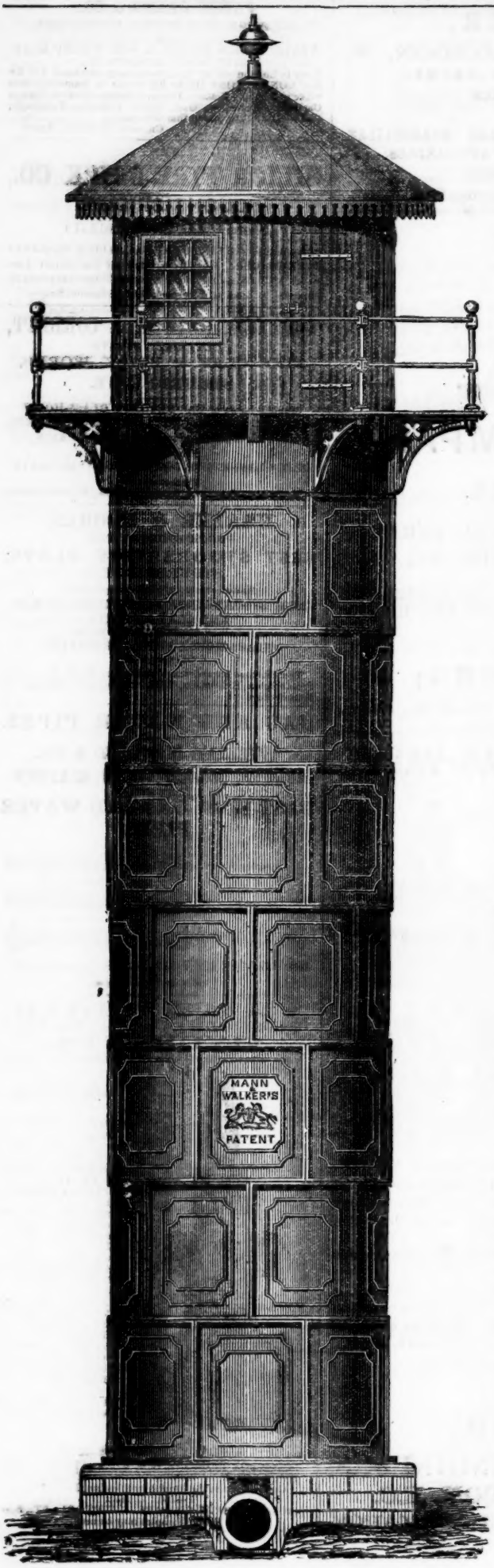

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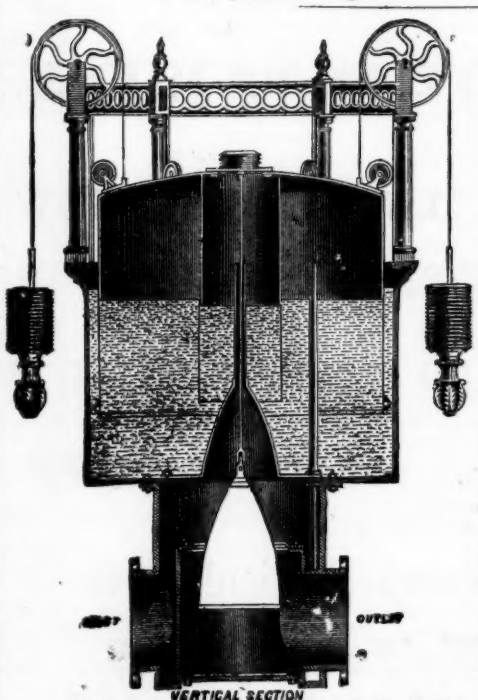

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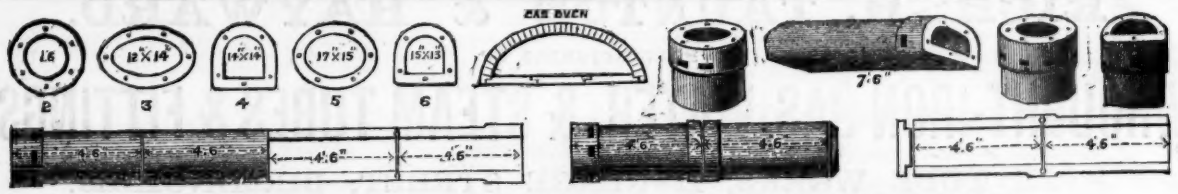

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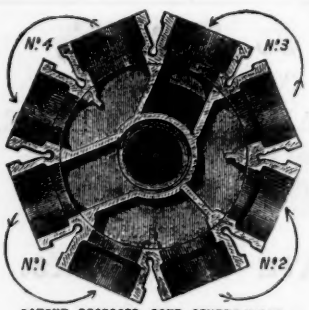

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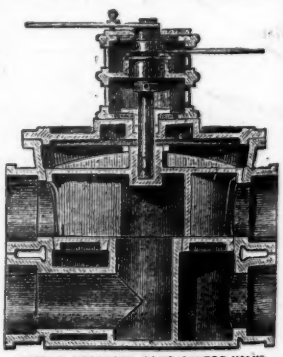

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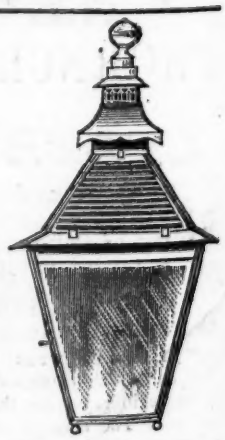

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